NOVEMBER, 1941

ELECTRICAL SOUTH

NO pleasure resort in the southern states has established for itself a more appreciative following of bridal couples, tourists, sportsmen and sportswomen than The Cloister at Sea Island Beach in Georgia. • This hotel and its entire surroundings are pronounced among the most beautiful and restful in the whole country. There is the finest golf course, the attractive beach, a large private hunting preserve, horse back riding, island and deep sea fishing, skeet and trap shooting, tennis, cycling, etc. • And, notwithstanding the fact that the management has always provided every known convenience for its most discriminating clientele, new features are constantly being planned to provide the last word in comfort. All the properties belonging to The Cloister community have long since been equipped with HUNTER'S Adaptair Type Ceiling Fans and HUNTER engineers are just now completing the further ventilation of these buildings by adding HUNTER Zephair Cooling Systems which guarantee an even flow of cool outside air.

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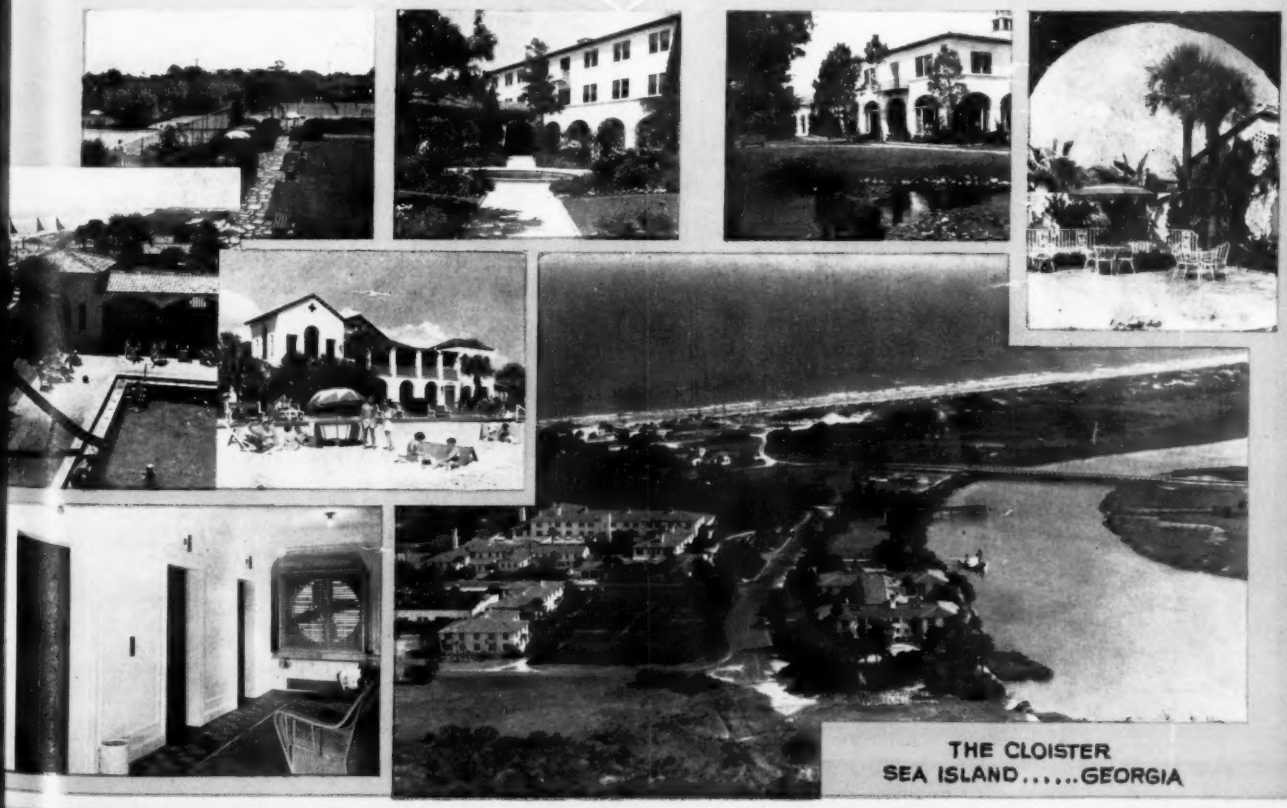

THE CLOISTER
SEA ISLAND.....GEORGIA

Dan Griffin Speaks for Steel...

★ Below are quoted the remarks of Dan F. Griffin, a steel worker in the Campbell Works of The Youngstown Sheet and Tube Company, made recently at a meeting of a Youngstown, Ohio, civic club. Reflecting the attitude of Youngstown employees, his words should be of interest to the users of Youngstown steel.

"Today, the eyes of the world are turned upon the ever-increasing conflagration in Europe. We realize that our nation has undertaken the gigantic task of transforming a peace-time nation into a nation geared to total national defense.

"The steel mill employee is playing an ever-increasing and more important role in this task; and the American steel man is tops in the industry.

"We know that as much depends upon the skill and devotion of these steel mill employees as on our armed forces on land, sea, and in the air. To a man, the steel mill employees of America appreciate they are among the highest paid workers in the world. Their working conditions are the best.

"The American steel worker has plenty of leisure time to do as he will. He can work in his garden; he can seek any form of entertainment, not only for himself but also for his family. He can study to improve himself, and quite frequently does. He is in no way limited.

"The highest office in our land has been occupied by men of the most humble birth. Freedom in America has never had a price, but its rewards are unlimited. Your steel mill employee knows that he cannot buy freedom—he must think freedom—he must work for freedom.

"We treasure our American way of life as we have it today. We're prepared to go to any lengths to preserve for ourselves and for our children that tranquility, that comfort, that peace, which we have enjoyed in years past.

"We're willing to pay our share in money or labor—yes, we are already lending. We want our boys to serve—they're already being trained for service.

"Our steel workers' creed should be an all-out effort to procure peace for ourselves and for the rest of the world. If we must work harder or longer to produce the steel necessary to insure that peace, then we're ready and anxious to do our bit, for in that way only do we serve.

"The Army needs steel—we'll make it.

"The Navy needs steel—we'll make it.

"The Air Force needs steel—we'll make it.

"The whole world needs steel, and steel workers will make it, for the real steel man is a true American. He will never do or think anything to jeopardize America. He will do everything in his power to preserve America for Americans and Americanism.

"We'll remember, always, that the men of the Army, the men of the Navy, the men of the Air Force, those defending democracy and the men of production are all ONE.

"We're 'Sammies' on guard!

"The U.S. in United States means US."

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THE
YOUNGSTOWN SHEET
AND TUBE COMPANY
YOUNGSTOWN, OHIO

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Volume 21 Number 11

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Electricity Is Still
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Biggest Bargain

While the prices of food, clothes, rent, coal and other items in the family budget are soaring upward, the electric service in Georgia's homes is as cheap now as ever before. During the depression, our prices came down, along with other prices. In the last two years, while other prices have been going up again, the cost of electricity has STAYED DOWN.

Here's the record, year by year, in terms of average price per kilowatt hour paid by residential customers of the Georgia Power Company.

1930	5.73 Cents	1936	3.37 Cents
1931	5.36	1937	3.04
1932	5.22	1938	2.93
1933	5.16	1939	2.84
1934	4.00	1940	2.74
1935	3.63	1941 (to date)	2.73

The reason for this continuous decrease is two-fold. In the first place, our rates have been reduced several times in the past decade. In the second, our customers made lower rates for themselves through increased use of service.

More than ever before, electricity is Georgia's biggest bargain.

Georgia Power Company

FA BUSDUCT in strong 20-foot sections

In actual practice, the only weight borne by the Busduct is its own. Yet, under the weight of these two heavy men — approximately 500 pounds — the deflection in this 20-foot section is scarcely noticeable. This indicates the exceptional strength built into the design of FA Busduct.

This standard 10-foot section of Plug-in FA Busduct shows the nine plug-in outlets, and, from left to right: FA Shutlbrak Switch Plugin; FA Klampswfuz Plugin (open), and FA Klampswfuz Plugin (closed). 20-foot sections have 18 outlets.

FA Busduct is made regularly in standard 10-foot sections. But here was an unusual situation, because busduct supports in the plant were possible only at 20-foot intervals. This presented a special engineering problem of producing busduct in *20-foot sections* which would have *minimum deflection* under these supporting conditions. The problem was met by FA Engineering and Production Departments — and the specially designed equipment shipped in record time to a vital defense plant.

FA Busduct is the modern compact, flexible and convenient method of distribution for power and light. It is ideal when changes are necessary in machine layout. Time lost in placing or relocating machines is reduced to the minimum. Simply "move the machine — plug in — go!"

While both Feeder and Plugin types are made in standard 10-foot sections, variations are possible to meet special conditions, as above. Each standard section of the Plugin type is arranged with nine plug-in outlets on 12-inch centers. Suitable elbows, tees, end boxes, intermediate feed-in and feed-out boxes, are supplied to fit required space or position — whether on wall or ceiling.

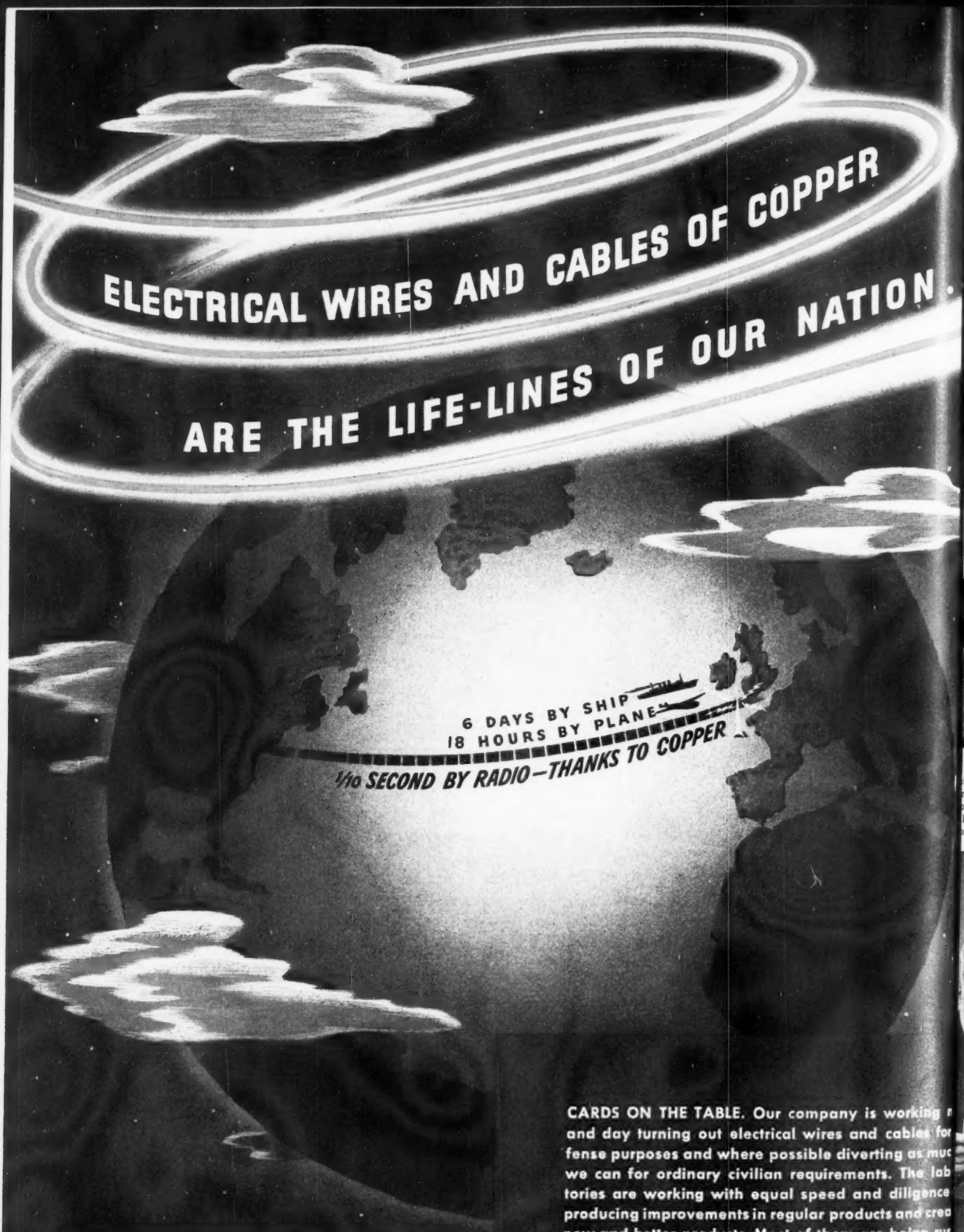
The copper busbars are contained in enclosures of steel or aluminum. They are rigidly supported at 30-inch intervals by specially designed insulators that insure proper spacing — to meet the requirements of the National Electrical Code. Contact surfaces of connecting bars are silver-plated, to insure low resistance joints. Designed for 2, 3 and 4-wire feeder systems; 250 volt DC, 575 volt AC, maximum. Plugin type capacities: 125 to 1,000 amps.; Feeder type, from 250 amps. and up.

FA Busduct is practically immune to deterioration. It may be taken down and installed in new positions, in the same or different buildings, as need may require. Extensions may be made readily to existing installations. Moderate first cost is combined with low up-keep.

FA Sales-Engineers Can Help Manufacturers, Architects, Engineers and Contractors with Their Distribution Problems

Their long experience and training are at your service — without obligation. Write for name and address of the one nearest you. Also, for Bulletin 61, which contains complete description, applications and detail drawings for FA Busduct . . . Frank Adam Electric Company, St. Louis, Mo.

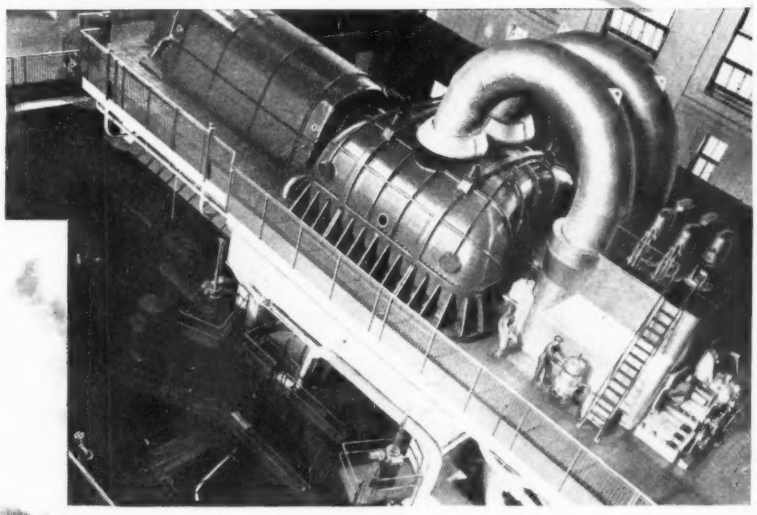
EST. 1891 — THE SIGN OF A BETTER JOB — FA — Frank Adam — 1891 FIFTY YEARS SERVICE 1941 — FRANK ADAM ELECTRIC CO. ST. LOUIS, MO. U.S.A.

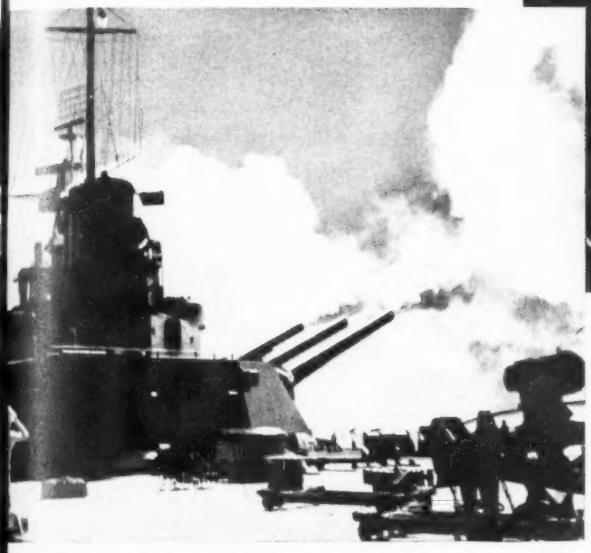

ELECTRICAL WIRES AND CABLES OF COPPER
ARE THE LIFE-LINES OF OUR NATION.
6 DAYS BY SHIP
18 HOURS BY PLANE
1/10 SECOND BY RADIO—THANKS TO COPPER

THE ATLANTIC—1/10 SECOND WIDE... Lightning communication between Hitler's enemies and America owes its birthright to copper ...radio telephony, direct wire communications, both depend on electricity...and there's one best conductor of that vital force...COPPER.

CARDS ON THE TABLE. Our company is working n and day turning out electrical wires and cables for fense purposes and where possible diverting as muc we can for ordinary civilian requirements. The lab tories are working with equal speed and diligence producing improvements in regular products and crea new and better products. Most of them are being rus into defense work with the result that until peace co you may be denied their advantages. But, when day does come, Anaconda wires and cables, better t ever, will be ready to go to work for you.

DEFENSE... IN INDUSTRY!

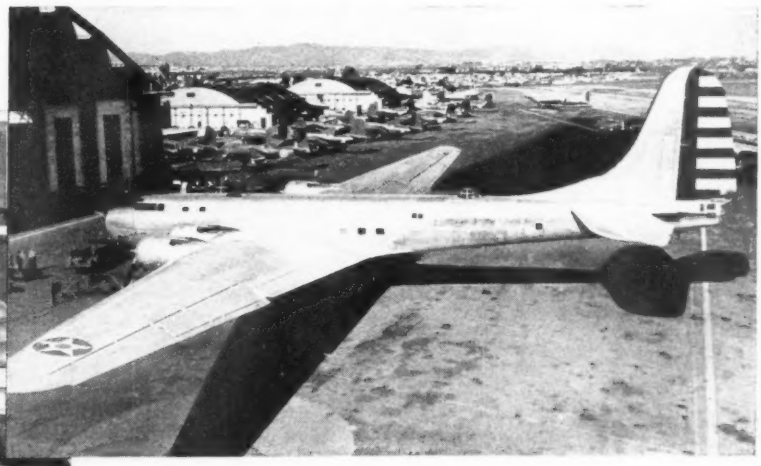




21/2 TONS OF TNT. Nine 16" rifles and ten five-inchers belch 10 d from the U.S.S. North Carolina. 2½ tons of TNT exploded in d this lethal barrage. Copper cable carried the electrical impulse to oint; copper wired fire alarm systems stood "at the ready" in case of In fact, over 2,000,000 pounds of copper were aboard the "Ency" per- res of vital tasks to help make it the most powerful war vessel afloat.

WHERE DEFENSE BEGINS. Airplanes make the headlines and tanks and battleships make the rotogravure sections, but there's something that must come first ... and that's the power to turn them out. *Power* is basic. It makes wheels turn, it is essential to American industry. From gigantic turbines like this one, amazing amounts of electrical energy are transmitted to war-essential industries through copper wires and cables. Without the copper conductors, power would be bound and immovable.

FIRST IN THE EYES OF THE WORLD. American aviation produced not only this giant, the Douglas B-19, but also faster pursuit planes, interceptors with lightning climbing speed and dive bombers that out-Stuka the Stukas. In each, there is a network of copper wires and cables carrying electricity to delicate flying instruments, to ignition systems that fire motors turning up over 1600 Hp. In the B-19, for example, there are seven miles of copper wires and cables.



THE VOICE HEARD 'ROUND THE WORLD. It's the voice of American industry. It directs the gigantic defense effort through copper wires and cables ... through the telephone ... through plant intercommunication systems ... in fact, through a network of copper nerves. And when the voice said "full speed ahead," the ears of the world listened attentively, eagerly. 41877

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A typical GRAYBAR Representative, Jim Jordan has been on the job for almost 20 years. For most of these years, he's been building up an intimate knowledge of the electrical needs of electrical contractors and other wholesale buyers in his home-town area. All this means competence in meeting your needs to save your time and avoid confusion. And it means a kind of confidence that can't be created as a short-run proposition.

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NOVEMBER
1941

Volume 21 No. 11

ELECTRICAL SOUTH

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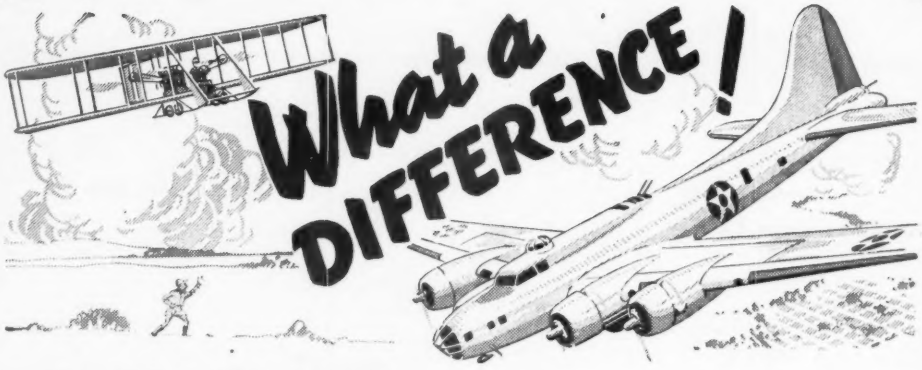
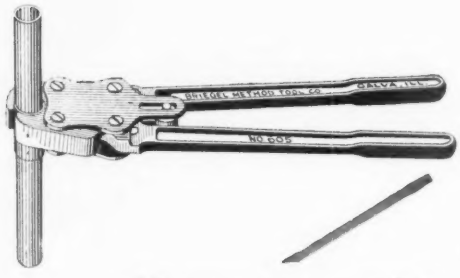
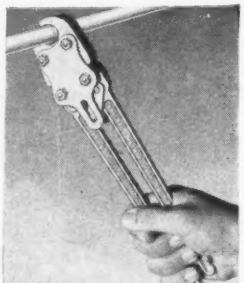


And there's just as much difference between the *streamlined* BRIEGEL METHOD of making connections and former old-fashioned methods.

The BRIEGEL METHOD saves you up to 50% on time and a substantial saving on materials allowing you a larger margin of profit on each job. Make quick . . . easy . . . strong and neat connections this MODERN way.





No extra turns or twists, no nuts to tighten when you use B-M connectors and couplings. Just TWO SQUEEZES with the patented B-M indenter (which costs you only $1.25) and you have a smooth efficient job. Approved by Underwriters Laboratories.

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A Great Publisher Passes Away

WILBUR RICHARD CARROLL SMITH, he was christened; but we suspect that not since his school days had anyone indulged in the formality of calling him by one of those given names. To a wide circle of friends he was known as "Dick." Among his junior business associates the affectionate term of "Captain Dick" was more commonly used. But, to quote an editorial in the Atlanta *Constitution* following his death, "it was as 'W. R. C.' that he was known to thousands of Atlantans."

He was stricken at his office desk in Atlanta one morning a few weeks ago. The sun shown brilliantly that warm October day, while from the busy streets below came the familiar noises of a large city going about its daily routine. But as Captain Dick was carried away to the hospital, the day became one of chill, dark foreboding to his co-workers in the company which publishes ELECTRICAL SOUTH. Only five days later their fears were justified, as he passed away on October 7.

Life still goes on. The publications he established are being continued as heretofore. The organization he had developed and which had been imbued with some measure of Captain Dick's courage and vision will endeavor to maintain his high standards of service, of efficiency and of business ethics. But to those who were associated with him, the slanting rays of the October sun had lost something of their brilliance and the familiar noises arising from the city streets had become harsh and nerve-racking.

Founder and chairman of the board of the W. R. C. Smith Publishing Company, Mr. Smith was recognized as the South's leading publisher of business and industrial magazines.

Mr. Smith was born October 16, 1872, on a farm near New Troy, Mich. After completing his education at Michigan State College and at a commercial college in Olean, New York, he was connected with the McGraw Publishing Company, of New York, as advertising representative. In 1899 he became part owner of the "Engineer," of Cleveland, Ohio, which paper was sold after a few years of successful development.

In October, 1905, Mr. Smith came to Atlanta and bought two publications, the "Southern Engineer" and the "Practical Machinist." He then founded the W. R. C. Smith Publishing Company. In the ensuing years he bought, consolidated or founded many periodicals, converting them into the company's five present publications: *Cotton, Southern Hardware, Southern Automotive Journal,* ELECTRICAL SOUTH *and Southern Power and Industry.*

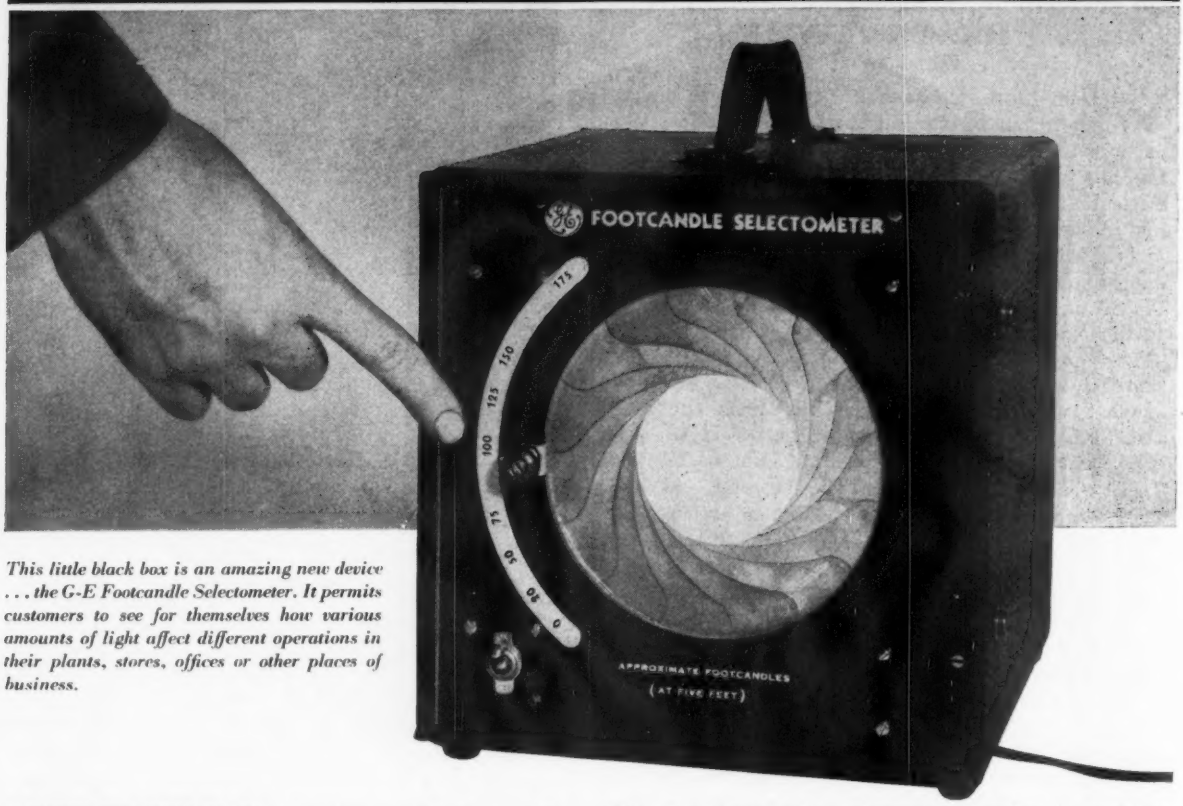
In early 1918 Mr. Smith was selected by the U. S. Secretary of the Treasury to have charge of the Liberty Loan trains which traveled throughout the Sixth Federal Reserve District and were responsible for the sale of millions of dollars of Liberty bonds. Later that year he was general chairman of the United War Work Campaign, responsible for raising nearly a half-million dollars in Fulton County. That year, also, he was elected president of the Atlanta Rotary Club, while two years later he became governor of the Eighth District, Rotary International.

In 1923 Mr. Smith was made a life member of the Atlanta Retail Merchants Association for "distinguished civic service rendered by him to the retail merchants of Atlanta." As president of the Atlanta Chamber of Commerce in 1925, he instituted a movement to advertise nationally the resources and industrial advantages of Atlanta, organizing the Forward Atlanta Advertising Commission. The following year there was a million-dollar advertise-Atlanta campaign, with Mr. Smith in charge.

In speaking some years ago of a business associate who had passed away, Mr. Smith made this comment, which seems to apply so well to himself: "He wrought with the minds and hearts of men, attuning them to a greater spirit of cooperation and happier belief in the worthiness of their occupations and prouder knowledge of their individual value to society."

Surviving relatives include the widow, Edna Pope Smith; four daughters, Mrs. C. L. Willson, of Anderson, Ind., Mrs. B. C. Carter, of Richmond, Va., Mrs. C. E. Reese and Mrs. John A. Boykin, of Atlanta; two sons, A. E. C. Smith, of Cleveland, Ohio, and Richard P. Smith, of Atlanta, both of whom are active in the business Mr. Smith established; one brother, J. Willet Smith, of Hornell, N. Y.; and several grandchildren.—*By T. W. McAllister*

How to show a customer a sample of 100 footcandles!



This little black box is an amazing new device . . . the G-E Footcandle Selectometer. It permits customers to see for themselves how various amounts of light affect different operations in their plants, stores, offices or other places of business.

IF YOU'VE EVER TRIED TO SELL a customer a 100-footcandle lighting installation, you know what a lot of resistance you've had to overcome before you got to first base.

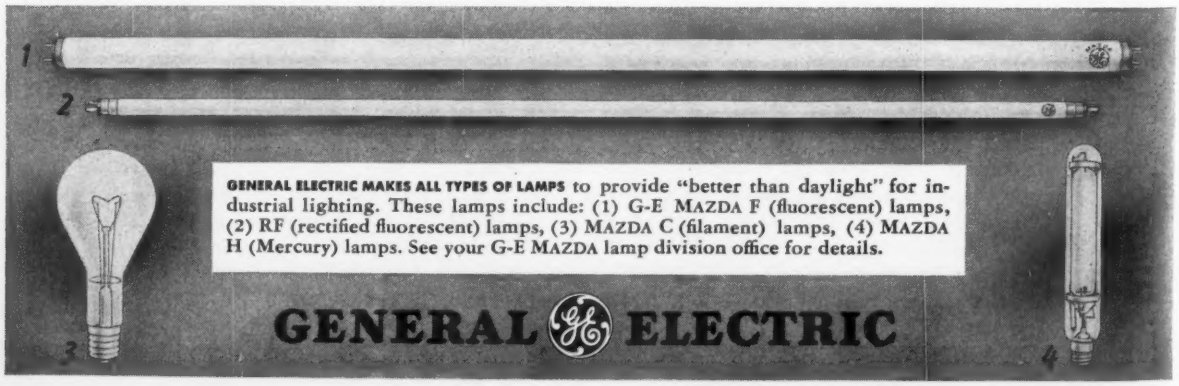
Why? Largely because 100-footcandles is something that's difficult for most people to visualize. If they could see 100 footcandles . . . actually experience how much easier, faster, and more efficiently they could work under 100 footcandles, higher level lighting would be easier to sell.

AND NOW THE G-E FOOTCANDLE SELECTOMETER provides the answer to the lighting salesman's prayer. It offers a means to show customers what 100 footcandles look like. Yet the Selectometer is just as portable and even lighter than most sample cases.

The G-E Footcandle Selectometer makes it possible for your customer to select the amount of light he would like for easier seeing. It works on a simple principle whereby the amount of light directed on a job can be increased or decreased . . . anywhere from 0 to 175 footcandles. After a little experimenting, the customer can tell when the light seems best to him.

FROM THEN ON, the experience of scores of lighting salesmen shows that the job of selling the higher level lighting installations is much simpler. Every lighting salesman in your territory should carry one. How many can you use?

For complete information, see your local General Electric Lamp Division Office.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GENERAL ELECTRIC MAKES ALL TYPES OF LAMPS to provide "better than daylight" for industrial lighting. These lamps include: (1) G-E MAZDA F (fluorescent) lamps, (2) RF (rectified fluorescent) lamps, (3) MAZDA C (filament) lamps, (4) MAZDA H (Mercury) lamps. See your G-E MAZDA lamp division office for details.
GENERAL ELECTRIC

ELECTRICAL SOUTH

NOVEMBER, 1941

SIMPLIFICATION OF WIRE TYPES PROPOSED BY CONTRACTORS

Smaller number of wire sizes and reduced insulation thickness is offered as means of reducing industry's requirements of copper, rubber and steel.

By George Andrae*

MUCH HAS been written since the 1940 National Electrical Code became effective, regarding the wire and cable situation. In the brief time at my disposal, I shall endeavor to state the case, and probably make a few comments and suggestions.

We are talking about rubber insulated copper conductors for building purposes, a commodity ordinarily of interest only to persons in the building line, especially electrical contractors. But since the 1940 Code arrived, along with the intensification of defense efforts, many other groups have interested themselves in certain Code provisions. The wire and cable section of the Code has had a lot of attention and study from municipalities, manufacturers, inspectors, the Army, the Federal Housing Authority, the OPM, the Bureau of Standards, and several other divisions and bureaus at Washington. As a result of those studies, some effort has been made to simplify the Code wire tables by short cuts that seemed to be justified by the present shortage of materials such as copper, rubber, and steel.

An important but only a preliminary step in the direction of wire and cable simplification, was taken April 23, 1941, when an industry conference was held at the Bureau of Standards. As a result of that meeting the Bureau has just recently made available its bulletin R180-41, containing provisions that went into effect July 1, 1941, and which are briefly as follows:

Wire sizes 14, 12, 10, 8, and 6 were adopted. Sizes 5 and 3 were omitted. Sizes 4, 2, and 1 were adopted. There was no question raised as to the desirability of including sizes 0, 00, 000, and 0000; these sizes therefore were retained. Someone questioned the actual necessity for retaining all of the last five sizes ranging from 250,000 to 500,000 cir mils. When called upon for my opinion, I replied that while one or more of these sizes undoubtedly could be dropped from the list of stock items, such action should be delayed pending further study by the industry.

It was then voted to adopt and include sizes 250,000; 300,000; 350,000; 400,000; and 500,000 cir mils in the simplified list. It was next decided by the conference that sizes over 500,000 cir mils, up to and including 2,000,000 cir mils, not be carried in stock but be available on special order only.

Standing Committee Appointed

The conference then authorized the appointment of a standing committee to have future charge of this simplification program. Questions left unsettled by the conference will be referred to this standing committee for study. It will also be the committee's responsibility to keep the program in line with new developments or changes in the industry, by recommending such revisions as are deemed essential. Any changes which the committee proposes are to be submitted to all concerned for approval, under the same procedure followed by the Division of Simplified Practice in securing acceptance of the original proposal.

The membership of the standing committee consists of a manufacturer, a wholesaler, and a contractor, namely:

H. H. Weber, U. S. Rubber Co., New York, who is a member of NFPA's Electrical Committee, and of the NEMA Codes and Standards Committee.

F. R. Eiseman, Revere Electric Supply Co., Chicago, who is chairman of the Wire and Cable Committee, National Electrical Wholesalers Association.

George Andrae, Chairman, Codes and Standards Committee, National Electrical Contractors Association, who will serve as chairman of this committee.

It should be of interest to know that the wire and cable simplification proposal was given voluntary, written acceptance by nine Federal departments or bureaus in Washington; by 57 municipalities from coast to coast; by over 700 manufacturers, distributors, electrical contractors and others classed as users; and by 24 trade associations. The Federal government, as the country's largest purchaser, has included the simplified practice recommendations in the Federal Standard Stock catalogue, and it is urged that consumers generally confine their specifications and orders, as far as possible, to the items listed.

The matter of wire and cable simplification, as some of us saw it last spring, naturally fell into two parts, one of which was taken care of through the Bureau of Standards,

*Adapted from an address presented at the annual convention of the National Electrical Contractors' Assn., in Houston, Texas, October 6, 7 and 8, 1941. Mr. Andrae is chairman of the NECA Codes and Standards Committee.

as just described in some detail. This had to do with simplification of wire and cable sizes. The other part of the job, still undone, has to do with simplification of wire and cable types, referring primarily to types of insulation.

Such an attempt at simplification was made prior to the June 10 meeting of the NFPA Electrical Committee in Chicago. It was hoped to produce a new Type R wire to replace the present types R, RP and RH; and even to replace RPT and RHT by having the new Type R wire smaller in diameter than present Type R. Of course, none of this could be put across commercially if the price was out of line, but new price sheets were actually distributed by at least one large producer, listing the new Type R wire at prices identical with the present Type R code wire. However, the very short time available for any manufacturer to produce the new product and for Underwriters' Laboratories to test it, prevented the getting out of test data on anything more than No. 14 wire, although it must be stated here that that test data was sufficiently favorable to show that the job probably could be done.

After attempting to correlate and reconcile some of the old code provisions with some of the new angles that developed, it was decided to turn over the entire proposal (labeled as Interim Revision Proposal No. 38) to a newly created Code Committee on Conductors — Article Committee 310. This does not mean that someone went off half-cocked, nor that we failed. We have succeeded in arousing more interest all over the country in a study of wires and cables than has existed for years. And for the first time, the National Electrical Code Committee has a separate article committee on conductors, Article 310. (I shall represent the contractors on this new committee.)

As the Bureau of Standards simplified practice table of wire sizes removes anything over 500,000 cir mils from stock lists, and since it is hoped and intended that this will greatly curtail the production and use of cables over 500,000 cir mils for building purposes, it therefore becomes immediately necessary to write a code rule permitting the use of two or more conductors in multiple for the larger loads. Such a proposed rule has been studied by, and circulated among, members of the new Article 310 Committee and should be announced very soon. At the time of writing this paper, the wording of this proposed rule appears as follows:

> "Conductors in sizes 1/0 to 500,000 cir mils, inclusive may be run in multiple provided all conductors are of the same circular mil area and are of the same length. Any type of conductor insulation may be used, but any set of conductors in multiple shall be of the same type of insulation and as few conductors as possible shall be used. Except as herein provided, conductors shall be run in multiple only by special permission or as permitted in Section 6205. Where conductors are run in multiple, they shall terminate at both ends in pressure connectors so arranged as to insure equal division of the total current between all conductors that are involved."

The running of cables in multiple has always been by special permission only; a rule such as the above would still require special permission for sizes under 1/0 and over 500,000 cir mils, but would permit you to use sizes 1/0 to 500,000 cir mils inclusive in multiple without special permission but subject to definite restrictions necessary from both a mechanical and an electrical standpoint.

At the June 10th meeting of the Electrical Committee, in Chicago, the proposed simplification of wire types (Interim Amendment No. 38) was referred to the new Article 310 Committee. This means that if we go along regular lines of code procedure, we may have something in the way of simplification of wire types in the new code about Nov. 1, 1943, which is still two years off.

There is an old saying that "haste makes waste," and surely in the formulation of code rules, haste is ordinarily undesirable, while mature judgment and a slow digesting of all possible developments is very desirable. Are we not now, however, faced with a situation where delay makes waste—waste in materials such as copper, rubber, and steel, all badly needed in the defense program. We have already agreed that there is a saving by running several cables of moderate size in multiple, instead of one very large one—a saving in copper, steel, rubber, and labor. Plain arithmetic tells us that there would be a saving in copper, rubber and dollars if we had one or two types of conductors instead of eight or ten, with a lot of money and materials tied up in slow moving stocks. The Code tables tell us that if we use cables such as 1/0, 3/0, 350,000 and 500,000 cir mils of Type RH—75° heat resistant insulation, instead of Type R with the greatly decreased values of the 1940 Code, that we can then cut down the conduit sizes and save a great deal of steel.

With all of the above in mind, and just to give those who know a lot more about this subject than I do something to shoot at, I have worked up a simplified table of wire

(*Continued on page* 60)

Table I—Comparison of Suggested Wire Sizes and Ratings With 1937 and 1940 Code Sizes and Ratings

Wire Sizes AWG	1937 (and prior) ratings	1940 Ratings			Suggested Sizes and Ratings	
		R	RP	RH	R	RH
14	15	15	18	22	15	---
12	20	20	23	27	20	---
10	25	25	31	37	---	---
8	35	35	41	49	35	---
6	50	45	54	65	---	---
5	55	52	63	75	---	---
4	70	60	72	86	60	---
3	80	69	83	99	---	---
2	90	80	96	115	80	---
1	100	91	110	131	100	---
0	125	105	127	151	---	150
00	150	120	145	173	---	---
000	175	138	166	199	---	200
0000	225	160	193	230	---	---
250	250	177	213	255	---	---
300	275	198	238	285	---	---
350	300	216	260	311	---	300
400	325	233	281	336	---	---
500	400	265	319	382	---	400

Electrical Industry Affected By Priority Developments

The "general repair" priority order in preparation, expected to be announced soon, may help contractors and dealers.

By Wilfrid Redmond

IT WOULD still require the powers of a major prophet to predict with any accuracy what lies ahead for the various branches of the electrical industry as a result of the priorities situation although much of the confusion has been removed during recent weeks under the leadership of Donald M. Nelson, new director of the Priorities Division.

In the words of electrical contractors right on the Washington scene who are able to go over to OPM and dig out applications stuck in the bottleneck, "it is plain h--ll, and getting worse day by day." "But," they add, "you can get materials if you work at it long enough and hard enough."

Important recent developments in the administration of priorities are:

1. An order assigning a preference rating of A-10 for repair parts to 20 essential industries.

2. An order assigning a preference rating of A-10 for maintenance and repair materials to public utilities.

3. A declaration of policy by the Supply Priorities and Allocations Board directing that no further private industrial or commercial construction be started until further notice.

Yet to come are a general repair order assigning a preference rating for all repair work and a new and revolutionary priorities program under which definite amounts of materials will be allotted to each industry both for defense and non-defense requirements and then broken down among the firms in that industry.

The repair order of September 9 included 20 essential industries but did not cover electrical utilities. The order gave an A-10 rating to materials for repair work. This gave the electrical contractor a preference rating for repair and replacement equipment in 20 industries. The Priorities Division is policing this procurement order very closely. It is expected that in many instances units will be replaced rather than repaired, but what OPM is watching is misuse of the rating to expand facilities.

Utilities, omitted in the first repair order, were the subject of a special order issued September 17, but the rating was extended to include not only repair and maintenance but operating supplies. "Operating Supplies" are defined as material essential to the operation of the utility and which is generally carried in the company's stores and charged to operating expenses. The rating cannot be used for plant expansions or new improvements, or for expansion of the service area of the utility. However, it may be used in some cases to provide for connections for new consumers to the existing utility system and also for materials needed to relieve serious overloads.

Utility stores of operating supplies and repair and maintenance material in accordance with an amendment to the order issued September 26 must be kept to a minimum not exceeding in aggregate dollar volume the amount of such materials in stock at the close of the utility's fiscal year ending during 1940.

The order, it was announced by the Priorities Division, contemplates in the near future the certification of specific quantities of materials to which the rating may be applied by the utilities to whom the rating has been assigned.

"It is essential," it was stated, "to set up a system so that the utility companies covered—publicly and privately owned — may keep their facilities and system in good running order. The present plan is designed to do that, but does not, of course, include any provisions for expanding operations or for new operations."

The announcement with the order further states: "The new order is designed especially to cover problems which have arisen in the utilities field and includes a number of technical provisions designed especially for utility problems. *The order itself, therefore, must be read carefully by all those affected by it.*

"The impact of the defense program has caused serious shortages in many materials and supplies used by utility companies and has also greatly increased the load on their facilities. A number of companies have experienced difficulty not only in obtaining supplies for new work but also in obtaining materials for repair and maintenance work."

The anticipated general repair order referred to on this page and discussed in detail on page 58 was issued October 16, after this article had been prepared. Unfortunately, the order was not as broad as anticipated. It provides an A-10 rating for maintenance and repair materials for manufacturing, warehousing, wholesaling, institutions — in fact, for practically every application except retail and residential establishments.

No New Construction

On October 9, the Supply Priorities and Allocations Board announced a policy directing that no public or private construction projects which use critical materials such as steel, copper, brass, bronze, or aluminum will be granted priority ratings during the national emergency unless essential for defense or necessary to the health and safety of the people.

This policy applies to public projects—federal, state, and local—such as the building of post offices, court houses, and similar structures; to the construction of roads and highways; to river and harbor improvements; and to flood control and power projects. It applies to the construction of factories, lofts, warehouses, office buildings, and all other commercial construction. It applies to residential construction and public utilities.

Where construction actually has started and a substantial portion has been completed, SPAB said, efforts will be made to get the critical materials needed to finish the job.

The issuance of this order was regarded only as a formality, because for several weeks previously construction materials, including electrical equipment, were almost completely unobtainable.

(*Continued on page 58*)

Service Work May Be the Answer

There are indications that many contractors and appliance dealers may have to look to service work as a means of supplementing reduced sales and construction operations.

By John Garrison

WE could see it coming, and now it's here. This business of curtailed supply of appliances and wiring materials hasn't come upon us with the suddenness of a cyclone. We've had months of warning and if we've been smart, we've already started to do something to cushion the shock. OPM hasn't exactly been reticent about their plans to put the brakes on production, require higher down payments and shorten payment periods, and now it looks as though things may get a lot tougher before they get better. Still I'm one appliance dealer that isn't a bit worried, and I know of a good many others that are all set—or getting ready—to take things as they come.

Before and during a part of the last war—back in 1914-1917—I worked for an appliance house in one of the larger eastern cities. We had about the same conditions then as now; plenty of buyers but a dwindling supply of merchandise to sell. This firm kept up their dollar volume right through this period but by a very simple expedient. Instead of taking it on the chin, the boss put several of the salesmen out in the territory with instructions to call on all former buyers of appliances and solicit overhaul and repair work for the small service shop the company operated. Three of the younger salesmen who showed some mechanical aptitude were separated from their order books and told to report to the service department. There they were instructed in the simpler tasks and were put to work under the supervision of the regular service men.

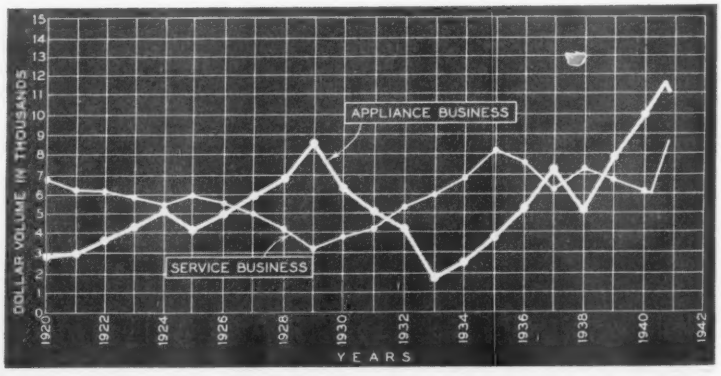
More Appliances Now

In those days there were not nearly as many appliances in use as now. Electric refrigeration hadn't come along, neither had electric ranges, water heaters, radios and scores of other appliances. We had to get our business from washing machines, electric toasters, irons, water systems and lighting fixtures. Yet these few salesmen went out among former buyers of these articles and brought in enough repair jobs to triple the size of the service department and keep the organization practically intact. If it could be done then, it should be a cinch to do it today.

These salesmen went among owners of equipment and talked along the lines of protecting the investment. For instance a salesman would call on a family who had purchased a washing machine two or three years before. He would explain to them that due to conditions it was almost impossible to buy a new machine on the market, and therefore they had better make sure that the old machine was in good condition. He told them that any machine, no matter how well constructed, is subject to wear and tear, and that an overhaul after two or three years use was not only in order but, under the conditions, was also good business and good sense. He would stress the point that repair parts were still obtainable but might not be in the near future. As I recall, about 50% of these calls landed business for the service department. Anyway, I know what kept that business going through the dark days—and it wasn't sitting in an empty store and cussing the War Industries Board.

I learned a lesson in that last war, and now I'm ready for this one. I learned not to put all my eggs in one basket. Selling new appliances—or anything else you are interested in—is a swell game when you have an ample supply, good times and eager buyers. The trouble is that such conditions never last more than a few years at best, and then you start to slide down the other side of the cycle. That's when a service department can be a big help in filling up the low places and keep the dollars coming in. Look at the chart and you'll see what I mean. This chart represents the relative income from new appliance sales and service work as shown by my books over a 21 year period.

The object lesson I learned in the last war period stood me in good stead during the depression years between 1930 and 1937. When I went into business in 1920 I didn't lose any time in getting a small service department established. My experience told me that a selling department and a service department go together



This chart, showing the approximate dollar volume of new appliance sales and appliance service work as reported by one dealer, indicates how the service department volume supplements sales volumes during periods of business depression.

like ham and eggs. The best equipment goes haywire once in awhile, and some lines develop "bugs" or defects that have to be straightened out to keep customers satisfied. It takes a service man to handle these complaints, as well as make installations, and if you have a service man you might as well go a step further and get some of the gravy—jobs that bring in the cash.

A lot of appliance dealers have managed to get along without any kind of a service organization but I don't think it is a good policy. It costs considerable to farm out installation and repair work, and then when a service department is really necessary to help out on running expenses you haven't got it. Selling and service work together in this way; when times are good and merchandise is plentiful people will buy new appliances rather than have the old ones repaired. With this condition you need the service setup to make the installations and to do minor repairs on all the equipment you're selling.

When times are bad, or when you can't get the merchandise to sell, your customers will pay to get the old stuff fixed up. This keeps the service department running full time and may well keep you in business. A customer who can't afford to buy a new washing machine, can usually dig up $5, $10, or $15 to get the old one back in service again. This also keeps the service end of the business busy.

A good many appliance dealers have been kidding themselves into thinking they have a service department when all they have is a few stray hand tools and a "handy" man. As a business getter and a profit maker a service department has to be a lot more than that. To go into the service end of the business you're to spend some money. Perhaps not a lot of money if yours is a small business, but you've got to have certain test equipment and tools if you want to accomplish anything worthwhile and get on the profit side.

Another thing you've got to have is at least one man who knows his way around in electrical-mechanical repairs. A man can't be too skilled for this business—considering all the things that a good service department is called on to repair—but he can easily be too sub-standard for the job. In almost every community there are always those young fellows who just seem to have the knack of doing appliance repair work—and like the work. The trick is in finding and hiring the right man. Graduates of trade schools, men who have a well equipped home workshop, radio repairmen, and typewriter-adding machine repair men are all good prospects.

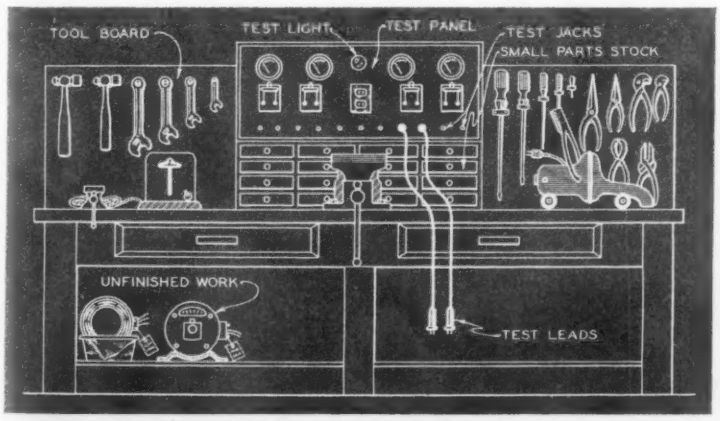
A typical service shop equipped for fairly large volume.

Modest Start Recommended

The appliance dealer, especially in the smaller towns, shouldn't go "all out" in establishing a service shop at the beginning. A better way is to give it a small but modest start—and then let it grow as conditions demand. There's a lot to learn and a lot of ground to be covered in appliance repairing. As a start it would be best to repair only such units as are sold in the dealer's store, or perhaps only a few of the larger items, such as washers, ironers, vacuum cleaners, mixers and toasters. Radios and electric refrigerators require knowledge of those lines and more expensive equipment. If sufficient volume is assured, go after those lines; if not play safe at the start and make a deal with a good refrigeration or radio man.

There are no hard and fast rules that apply to the equipment needed to start a small appliance service shop. However, the following items are suggested as being practical for ordinary servicing. An illustration shows the arrangement of a work bench and test

(*Continued on page 56*)



A well-equipped work bench is a necessity for a progressive service department. First class work can only be accomplished by a first class man with first class tools. This drawing shows a practical layout for a small appliance service shop. In addition to the small tools and test meters shown, such a shop should have a drill press, a lathe, reamers, arbor press, electric drill, and tap and die sets.

Profitable Trade-In Sales Increasingly Important

IF YOU'RE selling a lot of electric refrigerators as the Modern Appliance Company in Meridian, Mississippi, is doing, you are likely to be faced with the problem of what to do with the trade-ins which sometimes accumulate faster than they can be disposed of and create a need for more space than you have available. It was this space problem that first led the Meridian firm to try out a plan which is not only solving that particular problem, but what is more important, is proving an effectual aid in the selling of new units as well as providing a return on the investment represented by these trade-ins.

The plan might be called a sales-rental plan and is designed primarily to appeal to low-income groups and others who want and can afford electric refrigerators but who are reluctant to obligate themselves for the amount represented by the price of a new unit.

In discussing the firm's successful experience in pushing this plan, H. N. Lackey, part owner and sales manager of the Modern Appliance Company, explained its operation as follows:

"First, we select a list of prospects from among such groups as tenants of the U. S. Housing projects and others in the lower income brackets, and then go out and try to sell them a new refrigerator. If a sale can't be made, we then offer the prospect a fully reconditioned unit under a contract which provides for the payment of $3 a month for a specified period, the length of which is determined by the value of the unit. For example, if the value of the box is $36, then a 12-months contract is required to be signed.

"At the end of the contract period, title passes to the customer, but we don't stress that point unless it appears that that is what the prospect is principally interested in. Of course, what this amounts to in effect is a straight sale of a used unit, but the contract includes an optional clause which permits the customer to return the unit at any time before the end of the contract period and receive full allowance on a new refrigerator except for a deduction of one dollar for each month the unit is used after the first ninety days.

"That is the feature we stress along with these selling points: first, the monthly payment is no more than would ordinarily have to be paid for ice; second, if the customer should decide later to buy a new unit — a possibility which we suggest as being very likely—then the use of the reconditioned unit which he has had the benefit of in the meantime has cost him nothing, or at the most only a nominal rental charge of a dollar a month; and, third, even if he keeps the unit until the end of the contract period, he will have paid only the actual value of the unit to which he then receives full title.

Plan is Flexible

"We have found that this kind of proposition appeals particularly to those prospects who have already been considering the purchase of a refrigerator, or who can be sold on the idea, but who can't quite see their way clear to obligate themselves at the moment for the price of a new one. In a way, it's a sort of compromise. They think that perhaps they'll buy a new one a little later on, so they're reluctant to make an outright purchase of a reconditioned unit, yet they would like to have the use of a refrigerator in the meantime. And that's where the optional feature of our sales-rental plan proves a deciding factor. It has enabled us to dispose of a number of our trade-ins to prospects whom we could not have sold otherwise. And we have sold a number of new units to those taking advantage of their optional clause.

"Of course, there are some who are interested only in buying a used refrigerator in the first place, and in that case the plan is equally satisfactory both from our standpoint and from theirs. We get back some of our money tied up in these trade-ins and the customer gets a good reconditioned refrigerator at a moderate price."

But, as Mr. Lackey went on to point out, one of the principal advantages in pushing this particular sales plan lies in the fact that once a reconditioned unit has been placed on this basis, it makes it much easier to sell the customer a new unit later on. With this in mind, his firm is careful to see that each unit is thoroughly reconditioned before being installed, and free servicing is provided during the period of the contract. "In doing this," said Mr. Lackey, "we protect the reputation of our line and at the same time gain the confidence and good will of the customer."

H. N. Lackey, part owner and sales manager of the Modern Appliance Company, has solved the problem of disposing of his trade-ins through a sales-rental plan which also proves an effectual aid in the selling of new units.

Four-Way Prospect Plan For Used Refrigerators

FOUR sales sources for used electric refrigerators have been developed by Arthur H. Todd, appliance dealer, of Mt. Rainier, Md., near Washington, D. C. The

need for a definite program in the sales promotion of used boxes was particularly acute because the Washington, D. C., area in which Mr. Todd operates, is an 85 per cent replacement market at the present time. More than 50 per cent of his sales are trade-in deals.

The sales program for used refrigerators has been developed along lines used by the new car dealer who has had to meet the used car problem and work out a merchandising plan which involves reconditioning, finding used car prospects, and building them up for future new car sales.

The four major sources for used electric boxes selected by Mr. Todd are:

(1) Owners of old homes who have remodeled them into small apartments.

(2) Prospects who will not consider a new refrigerator because of uncertainty as to permanent residence in the city.

(3) Prospects who want to try out electric refrigeration with a used box.

(4) Owners of beach or mountain cottages.

The first three, according to Mr. Todd, are good prospects for future new refrigerator sales and even the fourth has possibilities. All, however, represent a substantial and steady market for used boxes.

Because of the likelihood that any prospect may be in one of four classes, Mr. Todd's first question is to determine the use to be made of the refrigerator. This is one phase of a program of sales control which Mr. Todd has applied to selling. It is just as important, he contends, to sell a prospect the right refrigerator as it is to fit him to the right hat.

If a prospect is buying a refrigerator to furnish a small apartment in a remodeled home, if he isn't sure whether he is going to be a permanent resident, if he has been influenced somewhat toward gas refrigeration, Mr. Todd trys to sell him a used electric refrigerator.

All used refrigerator purchasers are offered the proposition of applying the price of the used box on a new refrigerator if bought within six months. A deduction, usually $10, is made for handling and depreciation. The price of the used boxes averages one-third the cost of a new refrigerator of corresponding size. Prospects 2 and 3 are the best promotional material for this plan. Both, according to Mr. Todd, are ready for a new box within six months. Either the prospect has decided within that time whether or not he is to be permanently located, or he is sold on electric refrigeration.

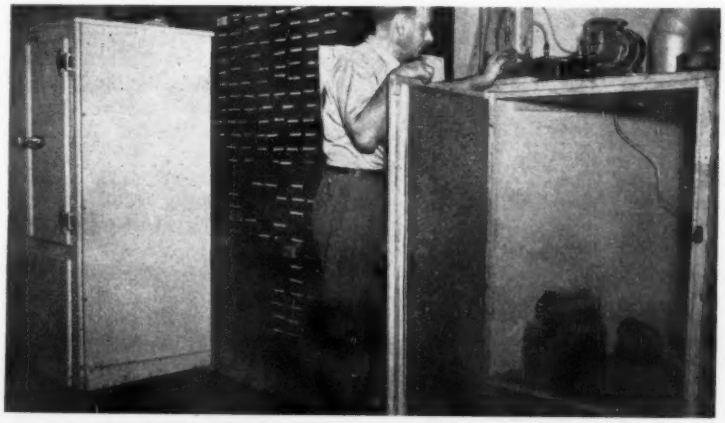
The sales problem with used refrigerators is one which is solved with a definite and thorough reconditioning policy. If reconditioning is not handled on a systematic basis the used job will not stand up and confidence in electric refrigeration is destroyed. There is plenty of resistance to overcome in selling a used refrigerator without the additional handicap of unreliable reconditioning.

Mr. Todd went in for reconditioning in a thorough manner. He set apart a shop for this work. The used refrigerators are moved out on the floor only after they have received a complete appearance reconditioning. Half-completed used boxes are not in sight. One service man and two assistants handle the work. When they are not out on service calls they are busy in the shop working on the used boxes. By utilizing their time in this way they make the used boxes ready for the floor without requiring a full-time shop man for the job.

Promotion of the used refrigerators is carried on with ads in local

(*Continued on page* 28)

Trade-ins are a real problem in an 85 per cent replacement market so Arthur Todd, refrigerator dealer, Mt. Rainier, Md., goes in for thorough reconditioning and a neat display section of used boxes.



The reconditioning shop, where Mr. Todd demonstrates the bake oven in which operating units are dehydrated at 150 degrees F. Service men work on the used boxes when not out on calls. Mr. Todd has had as many as 70 used boxes on hand at one time and sold every one to a market that does not conflict with new refrigerators.

MERCHANDISING MEMOS

Spotlighting some pointed appliance sales suggestions

By Roy A. Palmer
Merchandising and Advertising Manager, Duke Power Company, Charlotte, N. C.

A GOOD MANY salesmen are worried these days. And executives are worried, too, for that matter. Perhaps they have reason to be concerned. Are we going to be able to get merchandise? Are the usual channels through which goods move to the consumer going to be cut off? Will the buying spell which we are now experiencing, chill with the installment restrictions and taxes?

These and many other questions are in the minds of electric appliance salesmen today. It is only natural that questions should arise when such confusion and turmoil exists. And it's logical that we should have the confusion when we remember that this defense program is so stupendous that the very great majority of us cannot begin even to comprehend it. It's no wonder that we have unusual situations—the like of which we have never seen before.

The other day at lunch, a salesman joined our group and expressed great satisfaction at a call he had just made on a customer. "I induced him to cancel an order," he said gleefully. And he wasn't trying to be facetious, he meant it! That's selling in reverse. In times such as these, we can expect things to be cock-eyed. Things are changing so fast we can't keep up with them. And so we get uneasy, worried and upset.

Well, what are we going to do about it? Probably no one has a sure recipe as to what a salesman should do. But the adherence to some old-time fundamentals ought to be the safest bet. We have been and still are in a *seller's* market. The salesman's problem is more to get deliveries than to exercise his selling skill. To a considerable extent that's demoralizing because it has a tendency to make us soft. We become better order-takers than we are salesmen. We are inclined to scoff at the small customer and concern ourselves with the big one who gives us volume.

It's easy under these circumstances to forget to use selling ability, to keep contact with the smaller customer, to develop sales integrity and customer good will. We become less efficient in our operation and are less concerned about the quality of service we render. Yet these are fundamentals which must not be overlooked if we are to come through with any degree of conspicuous success.

This year is an unusual year. Like 1929, it cannot be used as a measuring stick for 1942. People have had more money than usual and they have spent it freely. The installment regulations and excise taxes have created buying spurts previous to the dates they became effective similar to the rush that women made for silk stockings when silk was cut off from Japan. Fear of shortage of merchandise has encouraged advance purchasing for future needs.

While drastic curtailment of merchandise in some lines will cut the 1942 volume, there probably will be a sufficient number of appliances to make 1942 compare favorably with some of the years previous to 1941. Salesmen lived pretty well then, but they had to do some selling. The higher down-payment will restrict the market but the credit manager will breathe easier and the salesmen will have less repossessed merchandise. Excise taxes are buried in a general price rise and won't concern the customer as much as it seems to do at the present time. Tricky practices, excessive allowances for trade-ins, and unprofitable deals will be more difficult to put over and obviously unnecessary to get sales.

The coming months are going to demand more honest-to-goodness selling than we have been accustomed to during this seller's market. We will also need a lot of educational work on the value and usefulness of electrical appliances. That's nothing new because we've done a lot of that before we got soft in the buying escapade of 1941. People like to be shown. And they forget so quickly!

The future needs faith, courage and resourcefulness. No salesman with these attributes will need worry. He must gird himself with determination to cope with the problems with renewed vigor. Work and more work will be the keynote to success. The obstacles which seem so big at first will dwindle under the attack of determined effort, and because of it all, the salesman will emerge triumphant — a credit to himself and to the electrical appliance industry.

Defend Your Business Security With Better Management

By Arthur Roberts

A field investigation conducted during the past year indicates an appalling lack of good business management among electrical contractors and dealers. Although good business management has always been an essential element in the successful operation of an electrical business, the need will be accentuated tremendously in the hectic days ahead.

In this article, space limitations make possible only a simple outline of some of the most important factors in good business management. In a series of articles to follow, these various factors will be discussed in more detail from the specific viewpoint of the electrical contractor and appliance dealer.

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THIS IS a time that is trying men's souls and business ingenuity. Never before in the history of this country have business men been beset with problems of such magnitude. The electrical contractor or dealer is no exception. Strikes, priorities, higher taxes, unfilled orders because of the inability to get shipments from the factory, are just a few of the abnormalities that are putting too much bingo and bedlam in barter.

During the past year on my round of accounting commitments, more than one electrical contractor or dealer has asked me, a bit despairingly, I thought, "What course shall I pursue to emerge from this emergency with profits instead of headaches?" My answer has always been, "Be a better business manager."

It is a far cry from the days when contractors were called bell hangers and depended upon bell wiring for main sustenance, to these days of rural electrification, fluorescent lighting, and electric insect traps. Technically, the electrical industry has traveled from the Dark Ages to "Better light—better sight" in less than 50 years but the managerial prowess of those who manipulate wires and pliers or sell appliances has not kept pace with mechanical development in this field.

Too many electrical contractors and dealers are still trying to manage a business with gay ninety complacency and, brother, that's no longer kosher. Those who endure after the duration will be those who know their business from Alpha to Omega and who keep a gimlet eye on operating developments always, not just once in a while, as has been the wont of too many contractors and dealers to date.

This has been said many times in days BD—before defense—and disregarded, but inasmuch as those times were less hectic, the omission did not always beget dire consequences. Scoffers and procrastinators got by, despite lax business management, so why worry? Adequate wiring campaigns and other business pep-ups sponsored by this industry brought business to contractors and dealers in sufficient volume to pay expenses and leave something in the kitty. If no net profit was forthcoming, well, the boss figured he drew a salary for his services, which was better than selling apples. That modus operandi is bad jive today because this emergency gives no leeway to inefficiency. It has plugged up the holes through which many an inefficient business manager slipped in the old days. Those who are now below par in managerial technique will have a hard time tramping the course.

Substantial sales volume, once the dependable yardstick with which to gauge profits, shares honors today with cost control. The contractor or dealer who can acquire big volume and control costs these days has a good chance to make a substantial profit, despite higher taxes and other hair-shirts. But, big volume alone does not assure profits; in fact, profits may decrease as sales increase today. That is the paradoxical situation that necessitates the modernization of your managerial methods now.

Of course, every contractor or dealer manages his business after a fashion and most of them assume that they are quite all right at it, that what they are doing is all that can be done to make a maximum profit. Nevertheless, impartial observation by experts begets the conclusion that the majority do not go to town on business management as thoroughly as they make their installations. There is more to business management than going through the motions of window decoration, setting the commission to be paid outside salesmen, or preparing an estimate.

To begin with, how many con-

Field Survey Indicates Need for Better Business Management Among Electrical Contractors and Dealers

The results of our field investigations indicate strongly that the electrical contractor or dealer needs to needle his operations with better business management from now on—or else!

Here are the highlights revealed by a business management survey among electrical contractors and dealers:

31 out of 287 budgeted operations . . . . . 11 per cent
42 out of 302 analyzed profit and loss statements . . . . 15 per cent
16 out of 176 allocated costs . . . . . less than 10 per cent
15 out of 182 analyzed their balance sheets . . . . . 8 per cent
2 out of 100 interviewed knew their working capital . . . 2 per cent
60 per cent did not consider depreciation when estimating
5 per cent used an adequate stock control system
50 per cent were operating with defective bookkeeping records

tractors or dealers use a budget? How many reading these lines are scheduling the compilation of the 1942 budget between now and the end of this year? Out of 287 electrical contractors and dealers recently interviewed, only 31 budgeted operations — about 11 per cent. Yet, the budget is the keystone of cost control.

In cataloging the ills of electrical contractors and dealers for many years, we find that a main weakness for many is not inadequate sales volume but continually mounting costs that soar unchecked until the condition becomes chronic and so dangerous to existence that the afflicted must take frantic action to save the ship. Unless you budget operations for a forthcoming period, you cannot maintain rigid control of costs. You must plan your work and work your plan.

"Budgeting is all right for big business but it is too complicated for a business the size of mine," is the reason given by the majority of contractors and dealers for not planning the future—an erroneous impression that stays the hand of effective management. Not only budgeting but every other fundamental of good business management can be used by all contractors and dealers in all classes.

Those who do contract work and sell appliances should know how to analyze the profit and loss statement, the second requisite to adequate business management. The budget details a plan of operation, the profit and loss statement analysis keeps a check on estimated versus actual figures and keeps costs in safe ratio to sales.

How many do more than take a hurried look-see at the profit and loss statement, then file it away? Our survey work sheets show that out of 302 case histories studied only 42 contractors and dealers analyzed their profit and loss statements properly—about 15 per cent. To budget beforehand and then not analyze the results of operations is half-baked management. Unless you do an "all-out" job of business management today, you won't have much to be thankful for in the way of profit.

Keeping an Eye on Overhead

Overhead has a mean way of eeling into danger zones unless you keep it under your thumb continually with profit and loss statement analysis. Direct job expense can get out of control easily when eyes are lax and wits sluggish. We know of one case this year where direct job expense jumped 32 per cent in three months because of costly delays and slovenly workmanship, big hazards these days when certain materials are hard to get and workmen feel too secure because of a dearth of labor.

Had this contractor analyzed his figures promptly he could have nipped this increase before it dug deeply into profits. We estimate that this negligence cost this contractor $5,000 and cases of this kind will be legion before the emergency passes into memory unless contractors and dealers install a four-square managerial routine in their business structure. A consideration of estimating procedure and turnover are by-products of profit and loss statement analysis.

The third requisite to profit is pro-ration or allocation. Again we refer to our survey work sheets and find that out of 176 electrical dealers and contractors, only 16 pro-rated costs and expenses to the various lines or departments handled, less than 10 per cent. In other words, if this test-check is considered a criterion for the remainder of the country, and our experience would make it seem so, 90 per cent of these "guinea pigs" are out on a limb because they do not know what lines are producing profit and which are the "weak sisters."

What the Balance Sheet Tells

The analysis of the balance sheet or financial statement is the fourth requisite to efficient management. Few know how to test their business blood pressure. The net worth was the sole yardstick used by 15 out of 182 contractors and dealers questioned, or 8 per cent, yet, this figure is not dependable if considered alone. The profit on investment, current ratio, net worth to fixed capital, net worth to obligations, inventory to current assets, and working capital requirements are some of the other factors that must be considered to determine whether a business is being run right or wrong.

Many know their profit on sales all right but ask them "What's your profit on investment?" and you have them stymied. Yet, the profit on investment, in the final analysis, is the real gauge to business efficiency and don't forget that Secretary Morgenthau recently suggested that this profit be limited to 6 per cent. Do you know how you would fare under that plan? You should know because it concerns you vitally but if you are untutored in the method of computation, if profit on net worth is just so much abracadabra, it isn't likely to concern you in the least, and you'll pay for your ignorance if and when such a law should be put into effect.

This brings up another reason why you must sharpen your wits on business problems. Governmental activities have a greater effect on business than formerly and there is little likelihood that Washington will back-tread, at least for some time. Hence, you should understand your business better than ever before in order to be in a position to adopt the best course when changes beyond your control are put into effect and to take aggressive action through the trade press and trade associations to combat legislation that may have the tendency to purge profits. For example, 6 per cent on sales may bulge the bank-

(*Continued on page* 55)

What Do You Know About Business Management?

How would you set up budgetary estimates for expenses covering 1942?
What is the difference between stock control and perpetual inventory?
What are fixed expenses?
What are variable expenses?
How much depreciation should be included in overhead on a frame building?
What is working capital?
What is invested capital?
What is fixed capital?
What is the current ratio?
How do you allocate overhead expenses?
How do you compute profitable selling prices?
What is the difference between mark-up and margin?
How do you figure stock-turn?
What is a pie chart?
What are reserves?
Describe methods of computing overhead expense.
What is prime cost?
What are check figures?
What is petty cash?
What is the break-even point in operations?

Electrical Grounding Practice As Required by 1940 Code

By B. Z. Segall
New Orleans Public Service, Inc.
New Orleans, Louisiana

One of the most important topics treated in the National Electrical Code is "Grounding." There is a great diversity of opinion on the subject, and this series of articles by Mr. Segall, discussing the most essential features of the Code requirements, should serve to clarify many of the problems that confront the contractor and inspector. Part 1 of the series on Grounding appeared in the June 1941 issue; Part 2 followed in the August 1941 issue; Part 3 was published in the October 1941 issue. The discussion will be continued in following issues.

BASICALLY, three standards are set up for obtaining an effective ground path from the ground to circuits, equipment, or conductor enclosures. The path to ground must:

1. Be permanent and continuous. Spliced grounding conductors, other than bus bars, do not insure permanency at the point where the joint is made and, therefore, the continuity of the ground path cannot be assured.

2. Have ample carrying capacity to conduct safely any current liable to be imposed on it. Under ordinary conditions the ground path must be of sufficient size to carry normal short circuit currents resulting from a breakdown of any specific system. Direct lightning strokes are by no means normal currents and are not to be considered in the design of the grounding path for interior wiring systems. Any ground path that heats up normally or burns up in functioning as a protection to a system is not a safe ground and should be redesigned to conform with the principles of this second standard.

3. Have sufficiently low impedance to limit the potential above ground and to facilitate the operation of the overcurrent devices. Any ground path will not necessarily permit enough current to flow, when the system insulation breaks down, to open the protective overcurrent devices. A relatively high impedance grounding system may actually be a detriment rather than an aid to good system operation.

As pointed out, these three standards are the basic requirements for obtaining effective grounding. All the subsequent grounding rules in the code are definite specifications designed to obtain these optimum conditions for grounding. Occasionally, it may be necessary, in the opinion of the enforcing authority, to augment or amend the specific rules. Then he is guided, in rendering his opinion, by these three prime requisites stated in this section on effective grounding. (See Figure 61.)

It will be remembered that the 1940 Code, for the first time, requires a minimum of two grounds on each secondary main system fed from transformer banks. For this reason a common grounding conductor may be used to connect both the grounded circuit wire and the service equipment and raceways to the ground. This is also illustrated in Figure 61 and is shown by the half tap connections from the service cabinet grounding screw to the bushing and the neutral connection respectively.

The grounding conductor may be connected to the grounded circuit conductor at any convenient point on the premises but must at all times be made on the supply side of the service disconnecting means. It is important to have this connection on the supply side so as to insure proper grounding of the interior wiring system at all times. Quite often service switches are used that disconnect the grounded service conductor from the system. The grounding connection being placed on the supply side offers protection to the system even when the service disconnect does open the grounded service conductor.

Specifically, it should be noted that this rule permits the installation of the ground connection in the meter base of an outdoor weatherproof meter. Some contractors and wire men believe that the connection can only be made in the service switch. However, it should

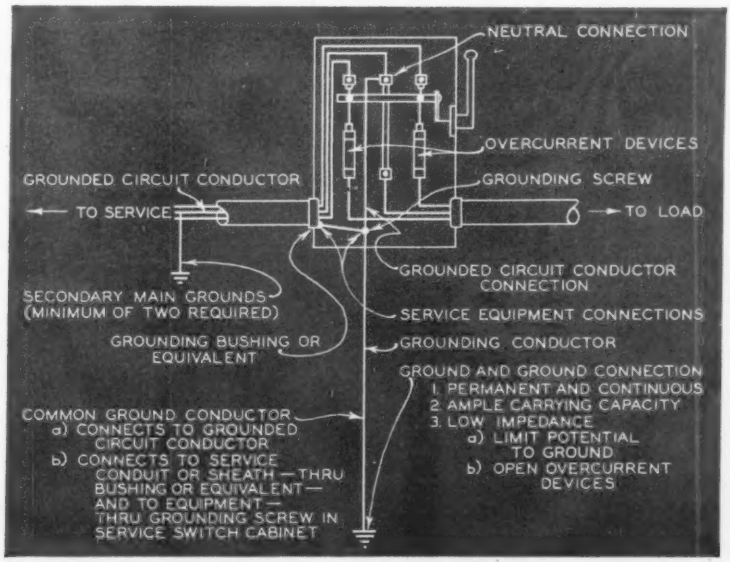
NEUTRAL CONNECTION
OVERCURRENT DEVICES
GROUNDED CIRCUIT CONDUCTOR
TO SERVICE
GROUNDING SCREW
TO LOAD
GROUNDED CIRCUIT CONDUCTOR CONNECTION
SECONDARY MAIN GROUNDS (MINIMUM OF TWO REQUIRED)
SERVICE EQUIPMENT CONNECTIONS
GROUNDING BUSHING OR EQUIVALENT
GROUNDING CONDUCTOR
GROUND AND GROUND CONNECTION
1. PERMANENT AND CONTINUOUS
2. AMPLE CARRYING CAPACITY
3. LOW IMPEDANCE
a) LIMIT POTENTIAL TO GROUND
b) OPEN OVERCURRENT DEVICES
COMMON GROUND CONDUCTOR
a) CONNECTS TO GROUNDED CIRCUIT CONDUCTOR
b) CONNECTS TO SERVICE CONDUIT OR SHEATH — THRU BUSHING OR EQUIVALENT — AND TO EQUIPMENT — THRU GROUNDING SCREW IN SERVICE SWITCH CABINET

Fig. 61. Ground connections must be permanent and continuous, of ample current carrying capacity, and of low impedance. All of the grounding rules in the Code are designed to obtain these optimum conditions.

be emphasized that as long as the outdoor base is placed ahead of the service disconnect, the installation of the grounding conductor connection in the meter base is permissible.

Underground service conduits or metal pipes are considered to be grounded if: (a) metal sheathed service cables are installed, and (b) the metal sheaths are bonded to a continuous underground metal sheathed cable system.

As a corrolary to this requirement, the Code considers the sheath or armor of underground service cables to be grounded if it is metallically connected to a continuous underground metal sheathed cable system. Since the service equipment and grounded service conductor of underground services must be properly grounded it will be found that as a general rule the underground service conduit or metal pipe is connected to the grounding conductor.

Grounding Fixed Equipment

Fixed equipment is considered to be grounded if it is metallically connected to grounded cable armor or grounded metal raceway. Thus in Figure 62, the fixture boxes, motor switch cabinets, etc., are adequately grounded since they are interconnected with each other and the grounded service equipment by conduit and "greenfield." It should be noted that the motor frame itself is connected to the service grounding conductor through the metallic connection of the flexible metallic conduit between the motor terminal box and motor controller cabinet. The importance of good, tight, mechanical connections between the conduit and the cabinets, etc., cannot be over-emphasized. The entire grounding protection to the system depends entirely on well drawn up locknuts and bushings at each point.

The above method of grounding is easily obtained in most installations utilizing metallic raceways systems. However, in those installations where non-metallic raceways are used to interconnect the various parts of the wiring system the grounding of the metal boxes, cabinets, fittings, non-current carrying metal parts, etc., if required, must be accomplished by other means. The Code specifies three methods to be used.

If a non-metallic sheath cable is used, i. e., "Romex," "Braidex," etc., then a grounding conductor, if required, may be run with the circuit conductors in the cable assembly. Thus for two-wire circuits, three wire cable may be used, two for energizing the circuit equipment and the third to ground the equipment as necessary. Whenever such an assembly is used the grounding conductor may be uninsulated (bare) or insulated. However, if an insulated wire is used, it must be finished to show a green color in the braid or outer covering.

Where a separate ground conductor is required for knob and tube installations another wire may be extended with the knob and tube system to serve this purpose. This wire may also be insulated or bare, but if covered must have a green identifying color in its outer covering.

The third method is contained in a general statement which permits other grounding methods subject to the issuance of special permission by the enforcing authorities. This last rule must be considered in conjunction with the fine print note following it (Section 2556c). This note points out that electric ranges are to be considered as fixed equipment even though connected to the source of supply through a flexible cord. Specifically, this rule offers to those inspection authorities permitting the ground of the electric range frame to the neutral of the circuit feeding the range, official recognition of this practice. It should be noted that this is the only exception permitted for use of the grounded circuit conductor as a grounding means for equipment cable armor or metal raceways. This is further emphasized in Section 2559 where this exception is repeated.

In most cases the use of this type of construction offers a much better ground for the range frame than would the installation of a separate grounding conductor. A separate grounding conductor would usually be smaller and more exposed to mechanical injury. The neutral conductor feeding the range being relatively a large size is less apt to be broken and even if it did become disconnected or disrupted it would render the range entirely or partially inoperative.

In a previous discussion, it was pointed out that runs of metallic raceway, 25 feet or less in length, that are free from contact with the ground or grounded metal do not have to be grounded. However, in some cases such isolated sections, such as conduit line in brick garages of frame residential buildings, etc., must be grounded. Under these conditions it would be best to ground these sections by connecting them to other grounded raceways by extending the grounded section of raceways or bonding the two sections together. If the connection of the two sections, i.e., grounded raceway section to the isolated raceway, is not practical, or if no other grounded raceway is available then the grounding may be obtained by one of the methods outlined above for fixed equipment.

Many structural steel buildings have electrical equipment and raceways attached directly to the building's steel columns, girders, joists, etc. The structural frame of the building is entirely interconnected and grounded through its direct contact with the earth. Under these conditions the electrical equipment is considered to be sufficiently grounded.

Grounded elevator machines can serve as the grounding means for attached metal car frames. If these car frames are supported by metal hoisting cable attached to or running over sheaves or drums (metal, of course) connected to the elevator machines this metallic system can serve as a grounding path for the car frames.

Portable Equipment

The proper grounding of portable equipment is one of the major problems facing the electrical industry. More and more mechanical processes are being electrified. Portable electrical hand tools are fast replacing many of the old hand-saws, grinders, sanders, finishing tools, planers, screwdrivers and myriads of other devices. Home hobby shops are springing up everywhere—the handy man is becoming handier with the many new portable electrical tools being placed at his disposal. With the advent of these devices, the toll from electrical shock hazard has risen to such an extent that many inspection authorities have made mandatory rules for grounding of certain portable equipment.

The hazard, of course, develops in a breakdown of the insulation of the electrical windings in these devices and the resulting raising of the potential gradient of the non-current-carrying metal case of the equipment. The increased use

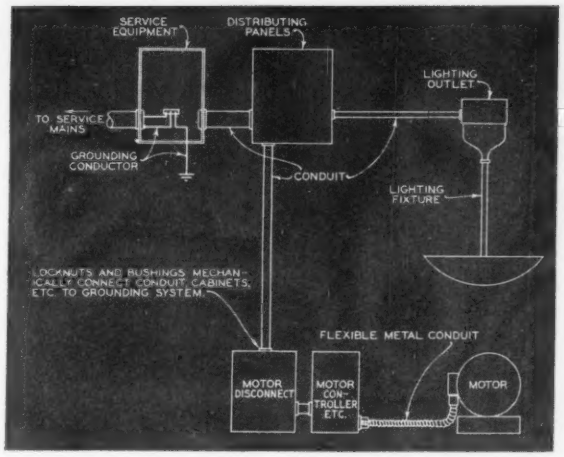

Fig. 62. Fixed equipment is considered to be grounded adequately when the fixture boxes, motor switch cabinets, etc., are interconnected with each other and the grounded service equipment by metal conduit.

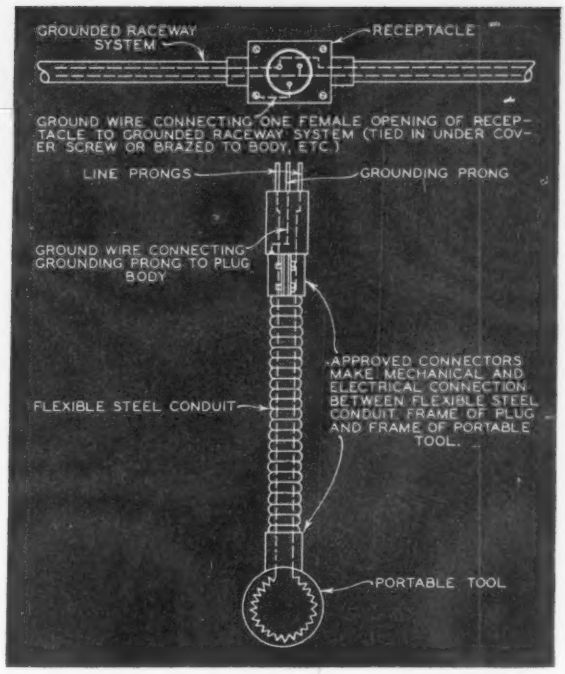
GROUNDED RACEWAY SYSTEM
RECEPTACLE
GROUND WIRE CONNECTING ONE FEMALE OPENING OF RECEPTACLE TO GROUNDED RACEWAY SYSTEM (TIED IN UNDER COVER SCREW OR BRAZED TO BODY, ETC.)
LINE PRONGS
GROUNDING PRONG
GROUND WIRE CONNECTING GROUNDING PRONG TO PLUG BODY
APPROVED CONNECTORS MAKE MECHANICAL AND ELECTRICAL CONNECTION BETWEEN FLEXIBLE STEEL CONDUIT, FRAME OF PLUG AND FRAME OF PORTABLE TOOL.
FLEXIBLE STEEL CONDUIT
PORTABLE TOOL

Fig. 63. Suggested method of grounding portable tool by making use of three-pronged plug and flexible steel conduit between outlet and portable tool. If unarmored cable is used, a third wire can be included which will be connected from the third prong of plug to tool frame.

of plastic cases and other non-metallic materials has done much to eliminate the shock hazard. However, many of these portable tools, due to the particular service they are required to render, must perforce, continue to be made with some type of metal casing. The grounding of these metal parts is accomplished by any one of three methods outlined in the Code.

Where an armored cable portable cord is used to feed the portable equipment, the metal enclosure ("BX" armor or flexible metallic conduit) may be used as the grounding medium provided: (a) a multi-prong plug or equivalent is used, and (b) that the metal enclosure is attached to the plug and to the portable equipment in an approved manner.

One prong of the plug must be connected to the metal enclosure. The receptacle must contain a female opening corresponding to this prong and must be connected to the grounded raceway system feeding the receptacle. Figue 63 schematically shows this system of grounding.

If the ordinary unarmored portable cord is used to feed the equipment, grounding is accomplished in pretty much the same manner as described above. The portable cord used will have an extra wire which will be connected to one of the prongs of the plug at one end and attached to the equipment frame at the other end. This extra grounding wire may be bare or may be a covered wire, in which case the covering must be colored green to distinguish it as the grounding wire.

As a third method the portable equipment may be grounded by using a bond between the equipment and the receptacle. This bond may be separate flexible wire or separate flexible strap. It may be bare or insulated and since it is a separate wire not included in the makeup of the portable cord, it does not have to have a green colored covering. This method, of course, requires the ground wire to be protected against mechanical injury. In most cases, this separate wire is usually tied to the portable cord with friction tape.

Electrical Engineers To Meet in New Orleans

(*Continued from page* 25)

and Refinery Tour" will provide an opportunity to see sugar cane cut in the field, transported to the huge sugar mills, ground for the juice, and manufactured into sugar. Louisiana is the "Sugar Bowl" of the nation and this tour should prove of exceptional interest.

A personally conducted walking tour of the quaint old French Quarter of New Orleans has been arranged for the ladies desiring to attend. The tour will immediately follow a complimentary luncheon to be given the ladies at a famous old spot in the French Quarter. Aside from the excellent technical program that has been arranged, the New Orleans meeting committee promise Southern District engineers an unforgettable three - dav meeting. Often called "America's Most Interesting City," New Orleans offers the visitor an opportunity to view many sights of an engineering and historic nature. Both the flags of France and Spain have flown over New Orleans and these nations have left their imprint on the manners, customs and architecture.

Arrangements have been made for the use by AIEE visitors of the facilities of several of the golf clubs in and around the city, including the Audubon Golf Club, the Colonial Country Club, Lakewood Country Club, Metairie Golf Club, and New Orleans Country Club. Also, the salt water bathing, turkish bath, restaurant and other facilities of the centrally located New Orleans Athletic Club are available to visitors upon presentation of their convention badge. The facilities of the famous Southern Yatch Club, second oldest in the United States and fronting on Lake Pontchartrain, will also be open to the visitors. Sailing and yachting parties must be individually arranged. New Orleans also offers unlimited sport to the angler and duck hunter.

Southern Electrical Engineers Will Meet In New Orleans

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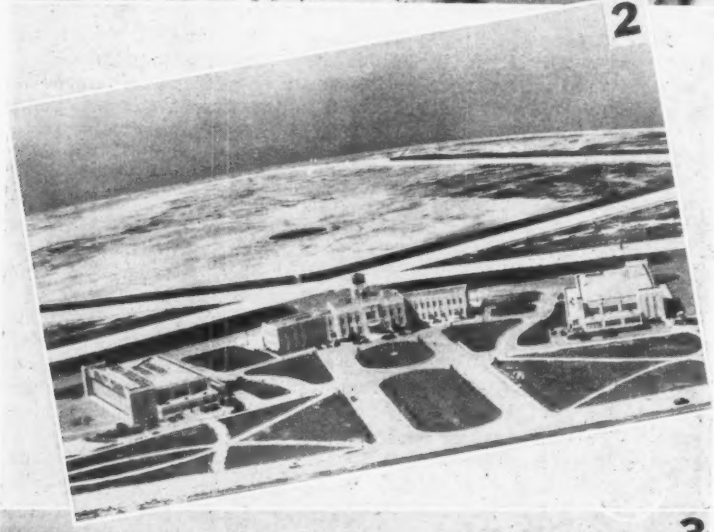

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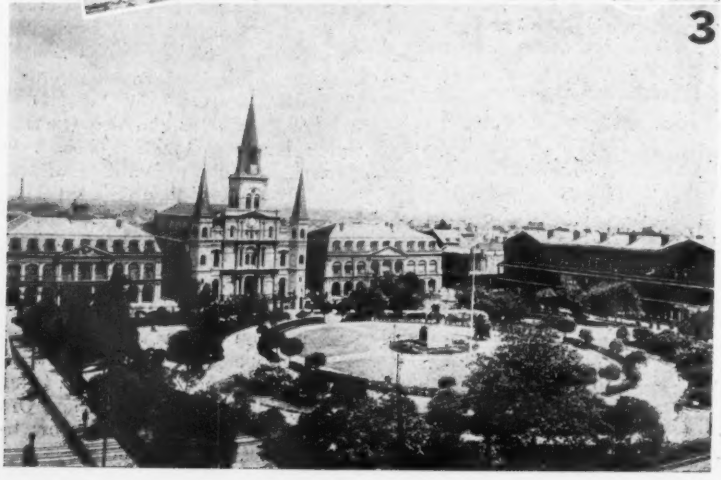

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A TECHNICAL program covering a wide range of timely electrical subjects has been announced for the three-day meeting of the Southern District, American Institute of Electrical Engineers, to be held in New Orleans, December 3 to 5, 1941. The St. Charles Hotel, centrally located within the business and theatrical section of the city and within a few steps of the historic French Quarter, has been selected as headquarters for the meeting.

With James M. Todd, of New Orleans, presiding, the Wednesday morning session will include an introduction of President D. C. Prince, of Philadelphia; an address of welcome by J. E. Housley, vice-president, Southern District; a report by H. H. Henline, national secretary, and an address by a prominent speaker yet to be announced.

Scheduled for Wednesday evening is an interesting lecture on "Lightning Phenomena and Its Behavior on Transmission Lines," by G. D. McCann, of Westinghouse Electric & Mfg. Company. Attractive features of this address will be the Kodachrome slides and the unique mechanical wave demonstrator which has proved so helpful in demonstrating electrical transient phenomena.

B. P. Babin, chairman of the New Orleans Section, will preside over Thursday morning's technical session. Scheduled for presentation at this session are the following papers: "Alcoa Rectifier Installation," by Harold Winograd, Allis-Chalmers Mfg. Company, and J. E. Housley, Aluminum Company of America; "Application of Electrical Welding to Ship Construction," by F. C. C. Brash, Mississippi Power Company; "Automatic Dimming of Automobile Headlights," by T. F. Ball, Lieutenant Commander, U. S. N. R.; "Formulae for the Inductance of Rectangular Tubular Conductors," by Thomas J. Higgins, Purdue University; and "Electrical Design of TVA Hydro-electric Stations," by Raymond A. Hopkins, Tennessee Valley Authority.

A student session will also be held Thursday morning.

The Southern District banquet and dance is scheduled for Thursday evening. It will feature an address by D. C. Prince, president, AIEE, and the award of student prizes.

A group of technical papers of particular interest to operating electric utility companies has been scheduled for the Friday morning technical session. "Carrier Current Relaying and Communication," is the subject of a paper to be presented by T. D. Talmadge and M. S. Merritt, both of Tennessee Valley Authority. "Factors Contributing to Improving Electric Service by Means of High-speed Switching and Utilization of Stored Kinetic Energy," will be discussed by J. T. Logan and J. H. Miles, both of Georgia Power Company.

Other papers to be presented at the concluding session Friday morning are "Low Voltage Underground Networks," by P. B. Boyd, Georgia Power Company; "Parallel Operation of Load-Ratio-Control Transformers," by F. M. Starr, General Electric Company; and "Ceramic Electrical Insulators," by Frank J. Stevens, American Lava Corp. Student prize papers will be reviewed during the concluding session.

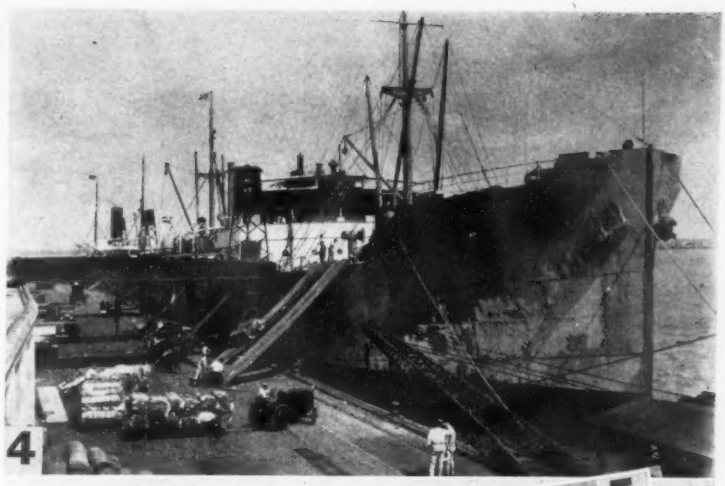
No general technical sessions have been planned for any of the afternoons during the three-day meeting, leaving these periods open for trips to nearby points of engineering interest. Three splendid tours have been planned with transportation furnished.

A "Harbor Trip" will include an inspection tour starting at the foot of Canal Street and the Mississippi River aboard the Dock Board's yacht "Hugh McCloskey." On this trip can be seen the mighty Mississippi River, 180 feet deep in low water; the many miles of banana, coffee, cotton and grain docks and warehouses; the Algiers Naval Station; dry docks for ocean going vessels; the Industrial Canal; American Sugar Refinery and other industrial plants too numerous to mention.

The "Drainage, Sewerage and Water Plants Tour" will visit one of the world's largest drainage pumping plants and a variable speed synchronous motor water supply plant. New Orleans has a high annual rate of rainfall and since practically the entire city is behind levees, all rain water must be pumped into drainage canals which lead into surrounding lakes.

The "Godchaux Sugar Plantation

(*Please turn back to page* 23)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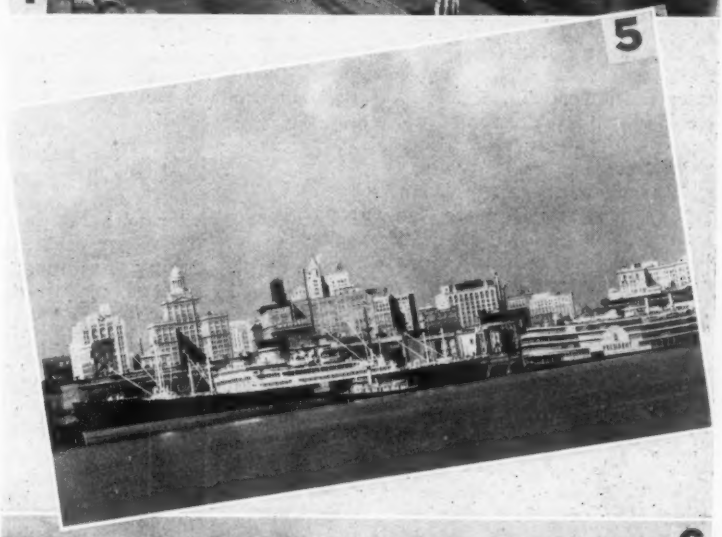
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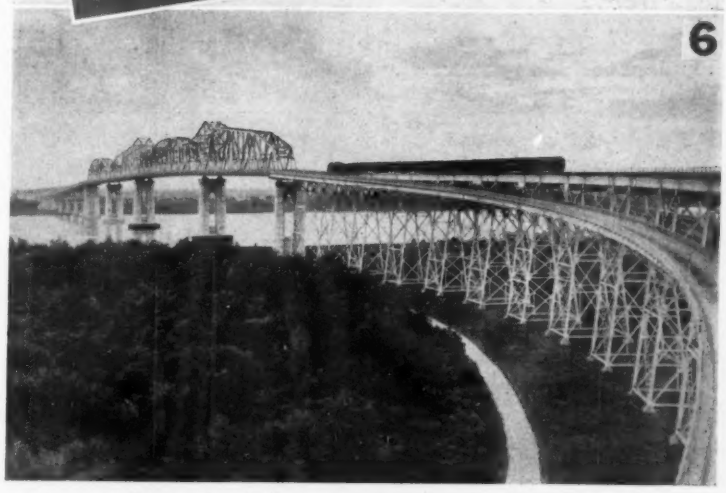
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Often called "America's Most Interesting City," New Orleans offers the visitor many interesting sights, of both engineering and historic interest. (1) Canal Street, said to be America's widest business thoroughfare, is the dividing line between the old city and the new. (2) New Orleans Airport: built on an artificial peninsula jutting out into Lake Pontchartrain. (3) Place d'Armes, now known as Jackson Square, had its beginning when New Orleans was founded in 1718 by Bienville. (4) Cotton loading: New Orleans is one of the greatest cotton ports in the world. (5) Dramatic skyline of New Orleans, Souths largest city. (6) $13,000,000 Huey P. Long Bridge across the Mississippi at New Orleans.

Primary Feeder Voltage Control

Comparative analysis of the relative effectiveness of regulators and capacitors for feeder voltage control.

By F. M. Starr
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Schenectady, N. Y.

THIS is the second of a series of articles discussing primary feeder voltage control. The first article, which appeared in the August 1941 issue, presented a general discussion of this problem. In this article, the results of a comparative analysis of twelve typical cases are presented. The concluding article of the series will follow next month.

IN ORDER to arrive at general conclusions regarding the application of regulators, capacitors and capacitor switching equipment, in various combinations, for primary feeder voltage control, twelve cases have been analyzed, that is, three conductor sizes have been considered and four values of peak load voltage drop for each of the three conductor sizes have been analyzed. The conductor sizes used were No. 6, No. 2, and No. 2/0; and the assumed voltage drops at peak load were: 10, 15, 20 and 30 per cent respectively.

For each of these 12 cases, three plans (A, B and C) were laid out having the following specifications, the voltage at all times and to all customers to be limited to plus or minus 5 per cent.

Plan A—Necessary regulators (or switching equipment) and no capacitors.

Plan B—Five per cent capacitors and necessary regulators (or switching equipment).

Plan C—Ten per cent capacitors and necessary regulators (or switching equipment.)

In all cases, a line 10 miles long was assumed and an uncorrected load power factor of 0.8 was assumed. Since the conductor size and the total peak load voltage drops were varied over a wide range, variation in power factor and length of line was not essential for our purposes.

Results of Analysis

Table I summarizes peak load data and the capacitor Kva (CKva) necessary to give both 5 per cent and 10 per cent voltage rise for the 12 cases.

The voltage control equipment which will be required in each case to meet the specified requirement is summarized in Table II.

The peak and light load conditions for Plans A, B and C, and for the four conditions of peak-load voltage drop, are shown graphically in Figures 10 to 24.

The 10% peak-load condition is shown in Figures 10, 11 and 12. Here, obviously, only two plans need to be considered, since either a 5% regulator with nothing else (Plan A), or a 5 per cent capacitor with nothing else meets the specified voltage requirements. Obviously, switching in Plan B is unnecessary and saves nothing.

The 15% peak-load condition is shown in Figures 13 to 16. In this case it so happens that a 10% capacitor can give a satisfactory peak load condition without the aid of regulators and the light load condition can be made satisfactory with switching equipment at a lower cost than with regulators. Plan C can be applied only to cases 5 and 6, and not case 4, however, since, as noted above, it is impossible to obtain 10 per cent voltage rise with capacitors on No. 6 conductor for most feeders.

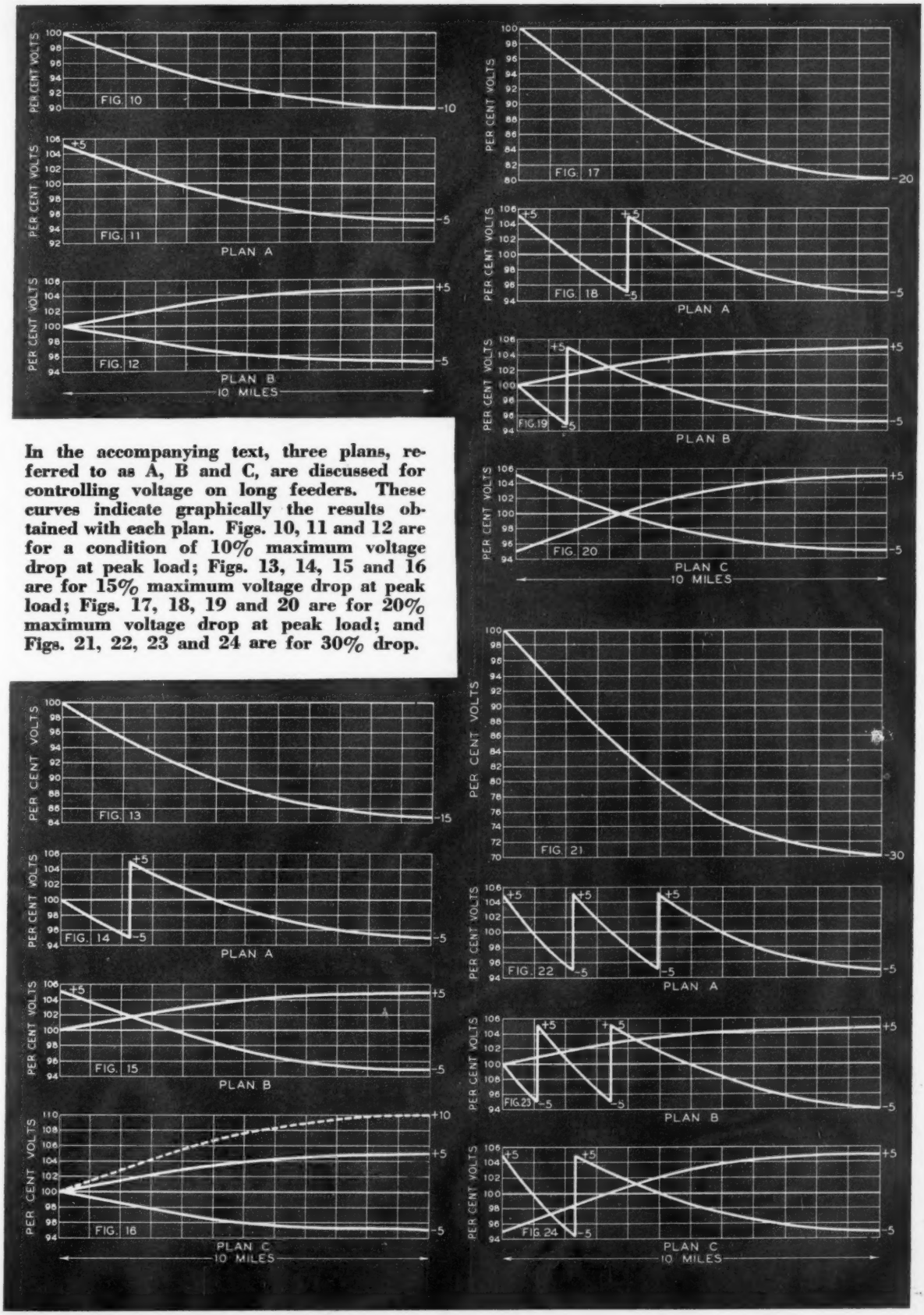
The 20 per cent peak-load condition is illustrated in Figures 17 to 20, which are essentially equivalent to Figures 1, 4, 7 and 9, which have already been explained and discussed in the preliminary analysis. (*See August 1941 issue.*)

The 30 per cent peak-load condition is illustrated in Figures 21 to 24. Here the maximum drop of 30 per cent is perhaps a little unusual, but occasionally does occur. Since 10 per cent is above the maximum voltage rise which it is practicable to obtain with capacitors, regulators are required.

Table I—Summary of Peak Load Data and Capacitor Kva

Case No.	Cond. Size	Peak Kva.	Peak Kw.	Peak RKva.	Amps	CKva. (5%)	CKva (10%)
			10% Max. Voltage Drop				
1	6	157	126	94	22	213	——*
2	2	301	241	180	42	228	456
3	2/0	447	358	268	62	242	484
			15% Max. Voltage Drop				
4	6	235	189	141	33	213	——*
5	2	452	362	270	63	228	456
6	2/0	670	537	402	93	242	484
			20% Max. Voltage Drop				
7	6	314	251	188	44	213	——*
8	2	602	482	361	84	228	456
9	2/0	895	716	537	124	242	484
			30% Max. Voltage Drop				
10	6	470	378	282	66	213	——*
11	2	904	724	540	126	228	456
12	2/0	1340	1174	804	186	242	484

* Note that with No. 6 wire the maximum voltage rise which can be obtained with shunt capacitors is 6.6 per cent. The above values of CKva can be closely approached in all cases with combinations of standard 10 and 15-Kva 3-phase units.



In the accompanying text, three plans, referred to as A, B and C, are discussed for controlling voltage on long feeders. These curves indicate graphically the results obtained with each plan. Figs. 10, 11 and 12 are for a condition of 10% maximum voltage drop at peak load; Figs. 13, 14, 15 and 16 are for 15% maximum voltage drop at peak load; Figs. 17, 18, 19 and 20 are for 20% maximum voltage drop at peak load; and Figs. 21, 22, 23 and 24 are for 30% drop.

Table II—Feeder Voltage Control Equipment for Three Schemes

Case No.	Plan A	Plan B	Plan C
	10% Max. Voltage Drop		
1	1—5% Reg.	No Reg.	——
2	No Cap.	1—5% Cap.	——
3	No Switches	No Switches	——
	15% Max. Voltage Drop		
4	1—10% Reg.	1—5% Reg.	No Reg.*
5	No Cap.	1—5% Cap.	1—10% Cap.
6	No Switches	No Switches	4-Switches
	20% Max. Voltage Drop		
7	1—5%, 1—10% Reg.	1—10% Reg.	1—5% Reg.
8	No Cap.	1—5% Cap.	1—10% Cap.
9	No Switches	No Switches	No Switches
	30% Max. Voltage Drop		
10	1—5%, 2—10% Reg.	2—10% Reg.	1—5%, 1—10% Reg.
11	No Cap.	1—5% Cap.	1—10% Cap.
12	No Switches	No Switches	No Switches

* Note that only in cases 5 and 6, Plan C, could capacitor switching equipment be used to any advantage at all. In no other case could it be used to replace any of the other equipment specified.

here to meet the voltage limits. In no case here, however, could capacitor switches be used to eliminate part of the regulating equipment.

Comparative Costs

The installed costs for the equipment tabulated in Table II for the various arrangements are given in Table III.

The above installed costs are based upon capacitors installed at $7.50 per kva. The regulator costs are based upon three single-phase outdoor regulators of proper ampere capacity for the particular feeder location with 20 per cent added to net price for installation. These are as follows:

Amps.	5%	10%
50	$3280	$3550
100	3550	4050
150	4290	6100
200	5080	7060

The cost of the capacitor switch complete with contact-making volt-meter and automatic equipment is $287 installed. This switch will handle up to 180 kva in 3-phase capacitors.

An examination of Table III indicates that in most cases, a combination of capacitors and regulators is the most economical way of meeting required voltage limits. In the two cases where capacitor switching was used, that is, cases 5 and 6, Plan C, the cost was less than Plan B, but greater than Plan A.

The concluding article of this series will appear next month.

Table III—Comparative Installed Cost of Voltage Control Equipment

Case No.	Plan-A	Plan-B	Plan-C
	10% Max. Voltage Drop		
1	$3280	$1600	——
2	3280	1710	——
3	3550	1815	——
	15% Max. Voltage Drop		
4	3550	4880	——
5	4050	5260	$4568
6	4050	5360	4848
	20% Max. Voltage Drop		
7	6830	5150	——
8	7600	5760	6970
9	10390	7915	7990
	30% Max. Voltage Drop		
10	11150	9200	——
11	14440	11880	11760
12	18240	14975	14880

Profitable Selling Of Trade-In Models

(*Continued from page* 17)

papers and by canvass. No special canvass is made on the used boxes, sufficient leads coming from the regular house-to-house calls on new refrigerators to keep the reconditioned trade-ins moving.

Salesmen maintain a watch for apartment-converted homes and inquire of each prospect whether or not he has a beach cottage. They give a sales talk on the disadvantages of carrying ice long distances for beach home refrigerators and paying high prices for it at country ice stations when a reconditioned electric refrigerator can be had at a price that represents considerable saving and trouble. Finally, one section of the sales floor is set off for used refrigerators. The display plan is orderly and attractive. The prospect is made to feel that some respect is shown for the used refrigerators and that the firm is in the business of selling good used boxes as well as new models.

Motor Starting on Networks

With the rapid extension of secondary network systems that is taking place, the subject of motor switches for increment starting is one of increasing interest and importance.

By E. S. Lammers, Jr.*

Space limitations have made it necessary to publish this timely article in two parts. In this first part, the author outlines the general requirements entering into the selection of switches for increment starting on network systems. A second article, to follow in the next issue, will continue the discussion. Characteristic curves for typical motors will be presented and the selection of starting equipment for specific applications will be discussed.

OVER THE PAST several years the 3-phase, 4-wire network system has proved itself a most economical form of distribution. While this system had its beginning in metropolitan areas, its sufficiency has reached a point where it is being used in new large industrial plants in preference to the old radial form of distribution, heretofore so commonly adopted. Wherever motor load and lighting load is to be served from the same network, the voltage is established at 208 volts, 3 phase, 4 wire—the lights being equally distributed from each phase to ground or neutral which is 120 volts. Due to this mixture of lighting and motor load, certain limitations must be imposed on the starting of motors above certain sizes in order to prevent flicker of lights. The enlarged use of air conditioning equipment in commercial areas of even the moderate size city has greatly increased the size and number of these motors in these areas to make this a timely subject.

At the outset it should be understood that a light is sensitive to sudden changes of voltage and a flicker is observable by the eye with a sudden change of voltage of only 1½ per cent. A gradual reduction of voltage in excess of this will cause a dimming, but it is primarily the flicker that annoys. Because of this, the problem is not a limitation of the size of motor that can be started on a network system but a limitation of the increment of change in the starting current. Obviously, every system has an inherent voltage regulation that will permit starting increments of a certain magnitude. Only practice and experience can determine the value, for diversification of the load enters very largely into this value. It is not expected that the starting increment should take care of worse conditions but of average distributed starting requirements.

For example, in a commercial area where there are a number of air conditioning units working on automatic control, it is conceivable that the wheel of chance might remotely call for a simultaneous start of all units, which would impose additional hardship on the system and call for more rigid starting requirements. But such a condition is very remote and the intent of all increment starting rules and regulations is to base limitations on average conditions that will give satisfactory lighting service. Experience is the main factor in determining the increment value.

Typical Increment Value

Some of the utilities specify a limitation of 350 amperes per step, within a minimum of ¼ second intervals. The time clause here simply means that the particular load must not subject the system to successive changes of current more rapid than ¼ second intervals. The control manufacturer, of course, can increase the timing of the starting steps beyond this as may seem either desirable or expedient.

Motor users in these areas are also lighting users and there is every incentive for them to cooperate with the electrical engineers to see that adequate starting rules are established and carried out; for a motor user to feel that the rules should be more lenient simply means that this leniency will be passed on to others, and that in the end, it will result in unsatisfactory lighting service not only to others but also to himself.

The problem is fundamental. Where the motor and lighting load is mixed the lighting service can only be protected by starting rules and regulations. When large motor loads were few and far between, the power companies did attempt to serve them from separate systems to protect the lighting service, but now with air conditioning, the motor load has become such a factor that it is no longer economically practical to serve it from two systems and the 4-wire network system is the answer. Thus, it is to the advantage of every user to cooperate wholeheartedly with these starting rules.

Small Network Problem

As cities of moderate size which do not have network systems find it advantageous to install this type of system, there will be some utilities particularly here in the South without previous network experience. This raises the question as to whether they should, at the outset, fix their starting requirements at values as high as those in established network areas in the larger cities. There should be some caution in this because the marketing area of a city of 60,000 people can be quite different from that of a city of 260,000 people. It is always easy to make a rule less rigid, but if experience proves that more rigid rules are required, then it does not help merely to tighten up on the rule and leave the unsatisfactory installations unchanged. Hence, experience indicates that more rigid rules are desirable in new areas until such experience is available. This is to the users' advantage and it does not impose any undue hardship.

For example, if the locked rotor current of a squirrel cage motor is 700 amperes and the starting in-

*Mr. Lammers is an industrial engineer with Westinghouse Electric and Mfg. Company, in Atlanta, Georgia.

crement is 300 amperes, it will require 700/300=2.33 or 3 point starting. If the starting increment was as low as 250 amperes it would still require only a 3 point starter and the cost to the user would be the same for the designer builds the starter to give equal increments; that is, increments equal to, or less than the specified amount.

There would be no good reason for building a 3 point starter with 300-300-100 ampere increments just because a maximum step of 300 amperes was allowable. The maximum is only used where the locked current is exactly divisible by the increment value. Thus, whether the rule limited the starting current to 300 or 250 ampere increments, the above starter would be built with increments of 233-233-233 amperes. However, in this case, if the rule allowed a maximum increment of 350 amperes, then a point would be saved, and a 2-point switch could be used, for the motor then could be started in exactly two increments of 350 amperes each. Such a saving of only one point is relatively small, taking the whole installation into consideration. The greatest difference in starter cost will be experienced where the division is between a line starter and an increment starter.

The above is simply given to show that there are cases where there would be no difference in increment starters over a relatively wide variation in increment value specified. The accompanying table presents this idea in tabular form.

It will be observed that in the table below there are a number of hairline divisions. This should not alter the fact that the supplier, on all high starting torque jobs where the motor is not apt to begin to turn over until the motor is across the line, should figure the number of points to be definitely and positively that value as determined by the tested locked rotor of the motor divided by the increment value allowable. The tested value of locked rotor current is emphasized because this can vary from published figures. All compressor jobs are of this nature; that is, the motor is not apt to start to rotate until the starting switch reaches the last point, for sufficient torque is not developed until the motor is across the line.

Difference in Points and Steps

There is sometimes some confusion between starting points and starting steps. With increment starters, there is always one less step than there are number of points. A line starter is a one-point starter but there is no such thing as a one-step line starter. A step always implies the closing of the circuit as the first point and then the closing of a resistance contactor as the next point. Hence, there is always one more point than steps.

A good way to think of this is to look upon the line contactor as the first point and all successive resistance contactors as the remaining points. Hence, in an increment starter, the number of points is always the line contactor plus the resistance contactors. The number of steps is always equal to the number of resistance contactors. It is preferable to define a starter by its points, but bear in mind that an increment starter has a minimum of 2 points or else it is a simple line starter.

It should also be stressed that starting on a network system must be a closed transition from step to step. Closed transition means that after the starting process is once begun, the line circuit to the motor is not to be interrupted. This eliminates the use of the auto-starter in its most common form.

In the case of an ordinary auto-starter, where the motor is started on the 65 per cent voltage tap, the starting requirement is light and the motor accelerates to 90 per cent of synchronous speed. At this point the starter is transferred from the starting tap to the 100 per cent running tap in an open transition. Let it be understood that no matter how rapid this transfer might be, the current peak on the reclosing of the circuit on the running or full voltage position can greatly exceed the locked rotor current of the motor at full voltage. The reason for this is easily explained. On opening the circuit to the motor, the flux or the magnetism already developed in the motor does not collapse instantly and for a short duration is left suspended in the motor. If this flux is left suspended in the iron of the motor, because of its magnetic inertia, it is developing a counter electromotive force in the winding of the motor. When the line voltage is applied, it might be applied 180 degrees out of phase and thus a transient peak of almost double the locked values could be obtained.

Oscillograph tests made on a 20 hp, 1750 rpm, standard squirrel cage motor during transition showed transient peaks as high as 1.8 times the steady locked rotor current of the motor. Obviously, such a condition cannot be permitted on a system where the requirement is for successive changes not to be more rapid than 1/4 second intervals. It is true these transients last only 1/60 to 1/30 of a second, but the very speed of their change makes them undesirable.

If these transients are to be avoided, then closed transition must be employed in the starting of induction motors. To further emphasize this point, it should be said that the higher the speed of the motor, the higher these transients for the magnetic inertia is higher where the flux per pole is the highest, and naturally under this condition there is more inertia in the magnetic circuit.

Comparison of Points Required in Starting Switches for Various Size Motors and for Various Starting Increments

(Data is for typical squirrel cage motor; normal starting torque, or high starting torque with low starting current; 208 volts, 3-phase, 60 cycle.)

Hp	Locked Rotor Amps.	Starting Increments in Amperes		
		250	300	350
3	64	Across-Line	Across-Line	Across-Line
5	92	Across-Line	Across-Line	Across-Line
7½	122	Across-Line	Across-Line	Across-Line
10	150	Across-Line	Across-Line	Across-Line
15	210	Across-Line	Across-Line	Across-Line
20	267	2 pts.	Across-Line	Across-Line
25	322	2 pts.	2 pts.	Across-Line
30	383	2 pts.	2 pts.	2 pts.
40	595	3 pts.	2 pts.	2 pts.
50	700	3 pts.	3 pts.	2 pts.
60	850	4 pts.	3 pts.	3 pts.
75	1280	6 pts.	5 pts.	4 pts.
100	1420	6 pts.	5 pts.	5 pts.

Highlights of NECA'S Convention

National defense, industry relations, and labor problems are among subjects discussed before electrical contractors.

(The following paragraphs, abstracted from addresses made at the fortieth annual convention of the National Electrical Contractors' Association, in Houston, Texas, October 6, 7 and 8, 1941, present some of the highlights of the convention. One paper, discussing the need for simplification of wire and cable sizes and types, by George Andrae, chairman of NECA'S Codes and Standards Committee, is presented in complete form as the lead article in this issue.)

Save Electrical Work for Electrical Contractors

By Robert W. McChesney
President, NECA

ELECTRICAL CONTRACTING is a highly technical engineering profession. It requires years of study and experience to acquire the necessary knowledge to serve the public efficiently and safely as an electrical contractor. The medium of electricity with which the electrical contractor works involves element of hazards to life and property which make it essential to public safety that electrical work be installed under the direction of *qualified electrical contractors.* Out of his training and experience the qualified electrical contractor builds an organization of skilled electrical workers, backed up by competent engineering, purchasing and supervisory service. Thousands of these organizations, large and small, cover the United States and Canada, located in every city and town, ready to serve every need of the public for electrical installations, maintenance or repairs. This is the *Electrical Contracting Industry.*

During the past year and a half we faced a serious threat to the future of this industry. Under the system of negotiated cost-plus-fixed-fee contracts for billions of dollars of defense construction, under which the Government absorbs all of the costs, there has been a great temptation for many unfriendly general contractors to build up *at Government expense* hastily assembled, inexperienced and uncoordinated electrical departments to handle the electrical work in addition to their general construction work. Once established such electrical departments would be available for the general contractor to handle other electrical work whenever it suited him. The National Electrical Contractors Association has successfully fought this threat against our industry and has so established the principle that specialty work should be done by specialty contractors equipped and experienced to do it, that the various Government departments have recognized the principle by agreements and departmental rulings. There are many general contractors, also, who recognize the efficiency and ability of the qualified electrical contractor.

The encroachment of unfriendly general contractors into the electrical contracting field, however, is not the only threat against our industry. There has gone on for many years a slow but continuous encroachment from other sources that is just as serious and requires effective action by our industry if we

Delegates from every section of the country gathered at the Rice Hotel, Houston, Texas, for the Fortieth Anniversary Convention of the National Electrical Contractors Association.

are to retain an important part of our business. This is not a situation which can be handled by agreement between your Association and any Government or other agency, but requires recognition by each electrical contractor that he shares the esponsibility and must do his part to recover and save that electrical work for *qualified electrical contractors.* I refer to the vast amount of industrial and commercial maintenance and alteration work, as well as new installations, that are being installed by plant electricians and maintenance departments. The recovery of this important field and the saving of this electrical work for the electrical contracting industry requires *better salesmanship* on the part of the electrical contractors . . .

NECA has been developing over the past year a *sales development* program to qualify its membership. There is no more important phase of any business, for without *sales development* business dies of starvation. An industry can by united efforts create opportunities for all members of the industry, but it is only through the individual effort of each member of the industry that he can obtain his share of that business. If we are to *save electrical work for the electrical contracting industry* we must lay the foundation by developing a higher degree of salesmanship and a better knowledge of our customers' needs and how they can be most economically and efficiently served.

The Electric Utility And the Contractor

By George R. Conover
Philadelphia Electric Co.

AFTER twelve years' experience as managing director of the Electrical Association of Philadelphia, and after two years with the Philadelphia Electric Co., I am firmly convinced that one of the most powerful and helpful allies of the utilities is the electrical contractor.

And why not? Who but the contractor actually prepares a new plant for the introduction of central station service? Who constantly modernizes plant operation? Who actually installs the many new current-consuming devices which not only improve the economic structure of industry, but likewise improve the working conditions of the employees?

Recently we added to our lines in Philadelphia a very large industrial establishment which will consume as much power as a city of seventy-five thousand people. All the physical work we as a utility performed was to run in the necessary cables to furnish the power. All preliminary work in preparing for the use of our power was done by an electrical contractor.

So I say to you without reservation—the advance guard of the entire industry, and one of the utilities' most valuable allies, is the electrical contractor.

Just last year the president of our company, Horace P. Liversidge, addressed this very convention in Philadelphia. He told you how our company had given to electrical contractors the task of changing over our remaining D. C. customers to A. C. This work cost over $400,000. He also brought out the fact that electrical contractors installed all electric ranges and water heaters sold in our territory. He pointed out that contractors were paid more than $2,000,000 for this work. He concluded his statement by saying, "Again I disclaim altruistic motives on the part of the company other than recognition that considerate ways of doing business mean money in the pockets of all concerned."

Since that speech by Mr. Liversidge we have expanded our policy. Right now a recognized electrical contractor in Philadelphia is completing the first substation job. Another substation is to be built by an electrical contractor this winter. Contractors are doing some of our line construction work and we are considering calling in a contractor to do another type of construction work which in all the years heretofore has been done by our own men.

Again I repeat, there is no altruistic motive in our doing this. It is an economic and practical gesture on the part of our company. In the long run we save money.

There is one factor in this matter which I do not believe you have recognized fully. The utilities have for years built up specialty forces. Many utility engineers were not convinced that the contractors were equipped nor sufficiently well informed on utility construction to do the work in the manner they desire. This was the case in our own company before we had an example of what a contractor can do. Consequently, this is not a question with us today. Our first experience in giving a substation construction job to an electrical contractor was so satisfactory from every standpoint that, as I said before, we are now expanding this policy.

Convincing the utilities of your ability to do the construction work is a task for each and every man in this room. It's a selling job and an important one. It means dollars in profit, many more dollars for you.

Service of the Council On Industrial Relations

By L. K. Comstock
Chairman, Council on Industrial Relations

THERE has never been a time in the history of labor relations when public attention has been so attracted to the evils and abuses of the strike as during the past 24 months. There was a time in past history when Labor's resort to the strike was justifiable on the ground that no other method was available to labor to fortify its aspirations for better pay, better hours and better conditions.

With the accumulation of court decisions, state and federal laws and the development of public opinion, the time has come to lay aside an outmoded, a barbaric, and an unjust method of settling labor disputes. It matters not whether this revaluation of opinion is the result of politics, social economics, changing public opinion or legal enactments, the fact that the strike is outmoded in men's minds is the significant characteristic of the last decade. That the strike is still used to gain legitimate and illegitimate aspirations on the part of labor is almost wholly due to the persistence of tradition founded years ago on factors in labor relations which have largely disappeared.

The one good thing about the Wagner Act is the legalization of collective bargaining. If the framers of that Act could have been content with legalizing collective bargaining and then putting a period to the Act, they would have gained and deserved the applause of the whole American people. But when they added to the Act, the denial of free speech to the employers, and the right of self defense, they at one and the same time violated the First Amendment of the Constitution and legally opened the door to strikes on a scale never before known in this country.

The Wagner Act is the mortal foe of cooperation. But collective bargaining was widely known and

The attractive program planned for the ladies resulted in record registration.

practiced in this country long before the Wagner Act was ever thought of. There were, however, many large employers of labor who denied the right of collective bargaining and a legal enactment seemed to be necessary to give their labor this right.

The more law, the more strikes; the more cooperation, the fewer strikes.

The Council on Industrial Relations is well on the road toward completing its twenty-first year. It was built on the philosophy of cooperation. It will continue on that philosophy and it will continue to produce results on that philosophy. It is the only philosophy that will produce results favorable alike to the employer and employee. Justice to both is the first consideration; and speed, though always desirable, can never occupy a higher place than second position.

It is remarkable that so little criticism has been levelled at the Council during these past twenty-one years. The Council has made no decision that has failed of acceptance by the parties at interest. There have been grumblings, yes, but they have only served the purpose of revealing an individual fancied injury magnified by comparison with the industry's gain in greater good-will, better cooperation, more fruitful collaboration—all of which are translatable into financial profit.

These factors have more influence on profits and customer relations than any other product of management—they are more difficult to obtain and maintain for they proceed from intelligence and character—they defy measurement but they are victorious in the competitive struggle. The Council was formed to make use of collaboration as a tool; it was organized on the philosophy of the abandonment of power and struggle and force and the substitution of collaboration and cooperation. The Council, 21 years ago, adopted the theory that the fundamental interests of employer and employee are identical. Now, more than ever, is this theory being recognized as true.

In these days when every ounce of productive energy is required in our fight to preserve our liberty and our democratic way of life and when every mind should be attuned to the accomplishment of that objective, how can we justify any stop-

(*Continued on page 37*)

What the Customer Should Know About Our Business

By J. Walter Collins
Secretary, Electrical Contractors' Assn. of City of Chicago.

NO OTHER item of building construction and operation has developed more in added usage, value, versatility and efficiency than the electrical installation. It would be safe to state that we have trebled its use and volume since the prevailing percentages were established. We know this to be a fact, but how are we to get a fair break for our trade?

One obstacle we have is a measuring stick and a base established many years ago to encourage the public to use electricity and to insure safety in operation. I speak now of the Electrical Code. It commanded uniformity backed up by police powers and it has done a good job as far as it goes. It was established when the element was new, novel and more or less convenient. It matched competition and costs in effectiveness. The basic standards that we assisted in establishing helped us to get away from the starting line and most of them are still in vogue.

The type of energy we are handling is just the same. If we comply with the Code as the average plan and specification expects so much from, we are assured no buildings will be burned and no lives will be lost. What the Code can be to us, beyond that point, is very little as its sponsors have no other logical reason for its existance.

The main idea of the Code is to establish that certain size wires, when properly installed, will carry a definite amount of energy with reasonable safety. What we get at the end of the circuit is something else again, but this Code still remains standard and apparently will be as time goes on. It is up to this

(*Continued on page 54*)

Inspectors Meet in Miami For Code Discussion

THE THIRTEENTH annual meeting of the Southern Section, IAEI, was held in Miami, Florida, on September 29 through October 1, with headquarters at the beautiful McAllister Hotel overlooking Biscayne Bay. About 300 members and guests were registered for the meetings and all branches of the electrical industry were represented.

The meeting was officially opened by President Frank Camus. Following addresses of welcome from representatives of the City of Miami, and response by W. A. Stall, G. E. Kimball, International president, was introduced. Mr. Kimball's address touched upon the present war conditions, the scarcity of materials due to government priorities, and the effect that this scarcity of materials is having upon the electrical industry as a whole.

President Camus introduced the International secretary, Victor H. Tousley, who discussed the type S tamper-resisting fuse. During the discussion of the specifications required for the new type S fuses, a point was raised concerning the retention of the time lag feature which is not included in the specifications. D. L. Johnson favored retaining the time lag feature and made a motion to that effect. The motion was seconded and passed, and the Southern Section went on record as favoring the time lag feature in the new type S fuse.

The Monday afternoon session opened with the report of the Executive Committee, who recommended the attendance of the Southern Section president at all chapter meetings. Considerable debate resulted as to any actual benefits derived from such procedure.

Section Gains 102 Members

Following a report of the various chapters, Charles Zimmer gave a report on the Southen Section. A net gain of 102 members during the past year was reported and a large amount of the credit for this fine showing was given to the new Mississippi chapter. Mr. Zimmer, as chairman of the Membership Committee, asked that all members contact their electrical associates and urge them to join the IAEI.

In the report of the General Committees, the proposal concerning joint meetings of the various sections, which was made at the 1940 Houston Meeting, was rejected.

J. J. Siddall presented an address on "Cellular Raceways" with slides showing various stages of an actual installation of cellular raceway under construction. He pointed out that in this type of wiring method, the structural members supporting the load of the building also serve as wiring raceways.

Arthur L. Abbott followed on the program, discussing the problem of voltage drop. The light losses in the three types of lamps (incandescent, fluorescent, and mercury vapor) were demonstrated and the effect of power factor on voltage drop explained. Mr. Abbott pointed out that voltage drop in the

Left to right: (1) W. W. Ingalls, Ingalls Electric Co., Miami; E. C. Knox, electrical inspector, Miami; A. L. Abbott, NEMA, New York; and G. M. Ross, TVA, Sheffield, Ala. (2) G. E. Kimball, president IAEI, San Francisco, Cal.; and N. E. Cannady, N. C. Insurance Dept., Raleigh, N. C. (3) H. M. Anderson, B. F. Faulkner, D. E. Reynolds, all of Florida Power & Light Co., Miami; and O. V. Scott, Miami Beach Electric Co., Miami.

larger size conductors (such as 500,000 cir mils) is appreciably reduced if such conductors are paralleled. For example: three 600,000 cir mil conductors having a capacity of 400 amperes have a voltage drop of 8-volts; if six 250,000 cir mil conductors of the same length, having a capacity of 400 amperes, are paralleled, the voltage drop is only 6¼-volts. Therefore, less copper has been used with the same current capacity and less voltage drop. Mr. Abbott also pointed out that paralleling of conductors will probably be the answer to the shortage of large size conductors during the present defense emergency.

Continuing the subject of voltage drop, Harper Davidson, of the Florida Power and Light Company, Miami, discussed power factor as it affects electrical inspection and consumption. By means of an actual wiring hook-up with loads, milliammeter readings and wattage consumption figures, Mr. Davidson gave a clear picture of the losses in circuit conductors and electrical installations due solely to low power factor.

Next on the program were panel discussions of questions pertaining to the 1940 code. These panel discussions were somewhat new to the Southern Section meetings but proved to be very interesting. A number of questions pertaining to different sections of the 1940 Code were prepared and these questions were read to the audience and panel members. If the question stumped the audience, then the panel would attempt to answer the questions. The answers are not official interpretations but the idea served to promote discussion.

Code Authorities Present

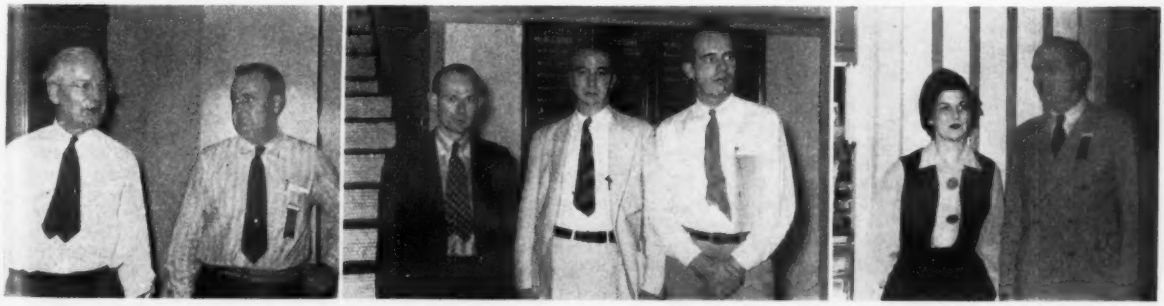
The panel for the entire program was composed of the following men: Arthur L. Abbott, Chicago, Ill.; Lee F. Adams, Schenectady, N. Y.; F. G. Camus, Shreveport, La.; N. E. Cannady, Raleigh, N. C.; M. M. Brandon, Underwriters' Laboratories Inc.; J. G. Fisher, Jackson, Miss.; H. N. Pye, Atlanta, Ga.; Jos. Whitner, Atlanta, Ga.; Vic. H. Tousley, Chicago, Ill.; C. M. Jones, Atlanta, Ga.; Geo. Welman, New Orleans, La.; Walter Stall, Jacksonville, Fla.; B. Z. Segall, New Orleans, La.; Howard Weber, New York, and E. C. Knox, Miami, Fla.

The Tuesday morning session opened with reports of the various Article Committees. The Article 200 Committee recommended that Section 2008b be changed to read "Terminals of utilization appliances shall be marked to denote the grounded conductor if the appliance contains switching devices as an integral part, or if it is connected to more than one side of the line." Some discussion followed this proposal but no definite action was taken. Panel discussions were resumed at this time.

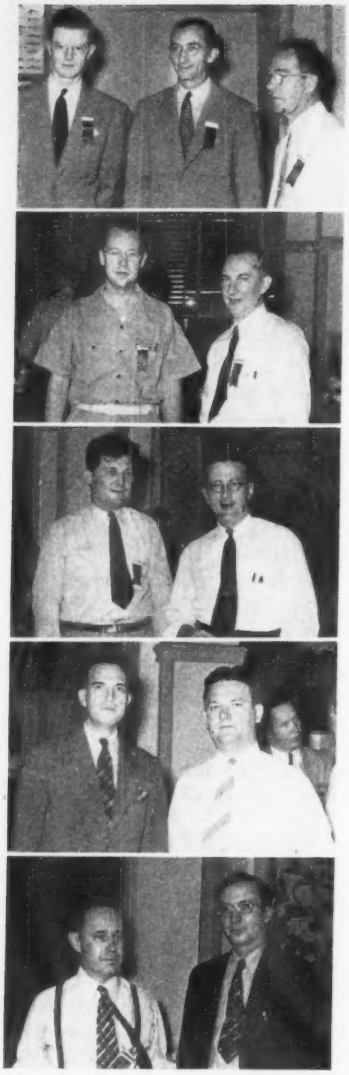
A moving picture with sound was presented by E. G. Romeiser, of the Porcelain Products Co., which demonstrated the desirable features and advantages of porcelain wiring systems, and pointed out the ease of installation of this equipment. Advantages of this type of wiring over metal enclosed wiring systems were claimed and the present shortage of metal due to national defense was stressed by Mr. Romeiser, who stated that there is no shortage of porcelain.

The Tuesday afternoon meeting opened with an interesting talk by J. W. Whittington, of the Public Relations Committee, on the benefits which could be derived from the Public Relations Committee. He stated that considerable improvement has been noted in the interest and the knowledge of the electrical inspectors of today. He stressed the fact that the inspector's job primarily is to prevent fires.

M. M. Brandon, of the Underwriters' Laboratories, Inc., an-



Left to right: (1) Victor H. Tousley, secretary IAEI, Chicago; and N. E. Cannady, N. C. Insurance Dept., Raleigh. (2) B. Z. Segall, New Orleans Public Service, Inc.; L. F. Adams, General Electric Co., Schenectady, N. Y.; and C. M. Jones, Underwriters' Laboratories, Inc., Atlanta. (3) Frank G. Camus, president Southern Section IAEI, and Mrs. Camus, Shreveport.



In the pictures, from left to right, and top to bottom: (1) R. E. L. Shirley, H. F. Woodall, both of Georgia Power Co., Atlanta; and C. G. Markland, electrical contractor, Winston-Salem, N. C. (2) J. P. Connally, electrical inspector, East Point, Ga.; and Joseph Whitner, Southeastern Underwriters' Assn., Atlanta. (3) Dewey L. Johnson, supt. electrical affairs, Atlanta; and D. O. Nash, General Cable Corp., New York City. (4) H. H. Weber, U. S. Rubber Co., New York City; and W. T. Roundy, Cutler-Hammer Inc., Orlando. (5) H. O. Bagwell, REA inspector, Carrollton, Ga.; and H. J. Flynt, electrical inspector, Winston-Salem, North Carolina.

nounced that the Laboratories new mobile unit will head south soon and that this unit can be routed through any towns desiring a visit or a check up on electrical materials.

The address of A. R. Small, president of Underwriters' Laboratories, Inc., followed. Mr. Small believes that the tour of the mobile unit in Florida some time ago was of extreme importance in that it put a stop to the dumping of merchanise seconds on the state of Florida. He stated that a very small amount of the flexible cords used in Florida were approved prior to the visit of the mobile unit.

Comparing the bulk of the 1940 Code to that of the 1925, Mr. Small added that the increased volume is due largely to details desired by the inspector group.

In discussing the failure of fluorescent lamps and fixtures, Mr. Small pointed out that generally there was insufficient flow of current to blow an ordinary 15-ampere fuse, and indicated that he was of the opinion that there should be no objection to the use of such lamps on larger capacity circuits, contrary to the official interpretation of Article 210.

Marion Hedges, Washington D. C., representing the IBEW, and cooperative member of the IAEI, stated that the IBEW now has representatives at all sectional meetings and also have members on the Electrical Committee. He expressed the opinion that a lowering of standards during the present emergency is not the best way to secure defense and protection of life and property.

A Code Breakfast at the Seven Seas Restaurant, which was surprisingly well attended by both the men and the ladies, opened the final day's session.

A Resolution from the North Carolina Chapter to discontinue recognition of the 3¼-inch outlet box and the clamp type switch and outlet boxes was introduced. Members of the Southern Section were of the opinion that continued use of these boxes is essential, especially in view of the shortage of other materials. No action was taken.

The question of acceptance of the threaded type electrical metallic tubing was brought up and considerable discussion took place. With the advent of the new enamel coated tubing to replace the present zinc coating, due to present defense emergency, it was felt that the threaded type fitting would insure a better bonding connection than could be obtained with the pressure connectors on an enamel coated tubing. A motion to accept this threaded type electrical metallic tubing was passed.

Walter A. Stall, chief electrical inspector of Jacksonville, Fla., was named president of the Southern Section, IAEI, for 1941-42.

A proposed change in pull box dimensions to allow more room in boxes for joints, etc., was read but action was deferred.

An address by G. A. Sawin upon "State Electrical Bills" was presented at this session. He pointed out that actual state inspection supervision is found in very few states. Several states, however, require all towns above a certain population to have electrical inspectors, and also appoint a state inspector to check on the individual towns. North Carolina is in the latter group, Mr. Sawin pointed out.

Following adjournment for lunch, the panel discussion was continued and several additional questions on Article 500 were cleared up. Considerable discussion arose as to the use of service drop (SD) and service entrance (SE) cable. A motion

C. M. Jones, inspector for Underwriters Laboratories, Inc., and supervisor of the Southeastern territory, with headquarters in Atlanta, Ga., was elected secretary-treasurer of the Southen Section, IAEI, at the annual meeting in Miami. Mr. Jones succeeds Joseph Whitner, of Southeastern Underwriters Association, Atlanta, who resigned after serving the Southern Section for more than ten years as secretary. Mr. Whitner was elected vice-president.

was made that the Electrical Committee work out some positive means of identification to differentiate between SD and SE cable, and the motion was carried.

A report by E. C. Knox on Section 2108b, which was requested at the Houston meeting, was given at this time. Mr. Knox felt that 200 watts per linear foot is too much and that 100 watts per linear foot would be sufficient. A motion to reduce the 2108b requirements from 200 to 100-watts per linear foot was defeated, and a subsequent motion to remove 2108b from the Code entirely was passed. Following the passage of this motion, a Committee was appointed to look into show window requirements and report back at the 1942 meeting.

A. J. Bommer stated that many inspectors feel that the Code should have some rules which would eliminate the possibility of three-phase motors "single-phasing," which results in burnouts, fires, etc. This trouble is usually encountered in commercial types of equipment.

The proper installation and construction of gas tube signs, especially with respect to cove lighting, was discussed at length.

Howard Weber, of the U. S. Rubber Co., discussed "Wiring Methods and the National Emergency." Mr. Weber believes that the paralleling of all conductors above 500,000 cir mils will probably be the answer to shortage of copper for large installations. He introduced a new table of wire sizes, prepared by G. H. Andrae, which are designed for use for the duration of the emergency, no changes being proposed in the present Code tables. This table is to be used in order to avoid the requirement of several types and sizes of wire and to require one type of wire only in fewer sizes.

Mr. Knox made a motion to revert to the 1937 Code carrying capacities of conductors. The motion was seconded but a substitute motion to refer this matter to the Executive Council for further study was made and passed.

Following the reports of the various committees, the nominations for new officers were read and all nominations were accepted. Officers elected for the coming year were as follows: president, W. A. Stall, Jacksonville, Fla.; 1st vice president, Jos. Whitner, Atlanta, Ga.; 2nd vice president, Paul L. Muller, New Orleans, La.; secretary-treasurer, C. M. Jones, Atlanta, Ga.

The Executive Committee will include E. C. Knox, Miami, Fla., chairman; Geo. Welman, New Orleans, La.; R. D. Campbell, Asheville, N. C.; Roy Speights, Richmond, Va.; and J. H. Eberling, Houston, Texas. Members elected to serve with the NFPA Electrical Committee were: N. E. Cannady, Raleigh, N. C., and J. G. Fisher, Jackson, Miss.

As a token of esteem and appreciation from the members of the Southern Section for his many years of able assistance as secretary and treasurer of the section, Jos. Whitner was presented with a check for a substantial sum. Mr. Whitner had previously asked to be allowed to resign because of increased volume of other duties. He expressed his appreciation for the remembrance and the pleasure he had derived from working with those of the Southern Section.

With the announcement that the fourteenth annual meeting of the Southern Section IAEI would be held in Richmond, Va., in 1942, and with an invitation for all to attend, the 13th annual meeting adjourned.

Left to right: (1) W. K. Stansell, Square D Co., Miami; and Clark Richardson, Cutler-Hammer Inc., Atlanta. (2) J. G. Fisher, Mississippi State Rating Bureau, Jackson. (3) F. O. Lyncker, electrical inspector, New Orleans; and I. H. Owens, Steel & Tubes Inc., Atlanta.

Service of the Council On Industrial Relations

(*Continued from page* 33)

page of work to argue over jurisdictional disputes, wage and hour disputes, and disputes which in other times have bulked large? Let us begin to see them in their true perspective and give them the value that belongs to them, a value properly proportioned to the sacrifices of life, health and property that so many other things are given to attain our great objective. We must not let any relatively puny dispute frustrate in any degree our effort to win the greatest battle of history.

Left to right: (1) Hugh B. Thrash, Harvey-Hubbell Co., Miami, Chas. A. Mayer, engineer, Atlanta; and T. J. Fleischer, Walker Electric Co., Atlanta. (2) E. A. Thibodeaux, Supt. Light & Water, Thibodeaux, La., and Mrs. Thibodeaux. (3) R. L. Byrum, electrical inspector, Greensboro, N. C.; J. M. Farrell, Carolina Electric Supply Co., Charlotte, N. C.; and Morris Landers, manufacturers' agent, Atlanta.

MOTOR Service

Temporary Cutting Out of Coils, and Speed Changes

By A. C. Roe

Electric Motor Engineer
Westinghouse Electric & Mfg. Co.

QUITE often the motor repair man is faced with the problem of making temporary repairs on lap-wound induction motors that will keep the motor in service until new coils can be obtained and a "time-out" period is available for rewinding which will not interfere with the production schedule. This means that in many cases defective coils must be eliminated from the active circuits. This can be classed as a voltage change, as the affect is the same as a motor operating on overvoltage. Thus the data given in preceding issues can be used for estimating the performance.

Cutting out coils in a series star or delta winding is a simple overvoltage problem, and if only a few coils are defective, then each phase can be balanced by eliminating a like number of coils in each leg. The per cent overvoltage can be calculated and the preceding tables consulted for the effect on operation.

A parallel star or delta connected winding presents a more complicated problem as each parallel leg must be kept balanced. A safe rule is that up to 10 to 15 per cent of the coils in one phase or leg can be cut out.

With four or more parallel connected windings it may be possible to figure out a new connection to return the voltage condition to normal.

In some cases, the defective coils may all be in one phase and in one parallel leg of a parallel connection. One such case recently occurred on a twelve pole six parallel star connected winding where it was necessary to cut out nine coils in a winding having 216 coils or 72 per phase, and 12 per parallel leg. The age of the winding prevented any reconnecting or handling. The nine coils were cut out and external resistance added in the parallel leg to prevent overheating. This kept the motor running until new coils could be obtained for a complete rewind.

When cutting out coils in any alternating current winding, care must be taken to cut one end of the coil open to eliminate any completely closed single turn. This is necessary to eliminate heating from a shorted turn or turns. The rule is "Cut open all coils cut out of circuit."

Speed Changes

With lap-wound induction motors of the squirrel cage type, speed changes are limited and depend upon the number of poles and frequency as shown in Table 1. There are some two speed single winding motors and some four speed two winding motors, but this discussion will be restricted to the basic factors that govern changes in speed in single winding lap-wound motors as any change from one standard frequency to another, or change in the number of poles, requires careful checking of many items.

Table 1—Standard Synchronous Speeds for 2 to 12 Poles

No. Poles	Rpm at 25 Cycles	Rpm at 60 Cycles
2	1500	3600
4	750	1800
6	500	1200
8	375	900
10	300	720
12	250	600

First we can check the effect of change in frequency such as 25 to 60 cycles. If we have a four-pole, 25-cycle motor, the 60-cycle, four-pole speed will be 1,800 or 2.4 times that of the 25-cycle rating. In this case, the voltage should be increased in the same proportion, or the turns increased, in order to obtain the proper characteristics on the new frequency.

Thus in changing the frequency without changing the number of poles, the voltage, speed and horsepower must all be varied in the same ratio if the magnetic conditions are to be kept normal. If the voltage is not varied by changing the turns or connections, then the horsepower and torque will vary as the square of the voltage conditions since torque depends upon voltage, and horsepower is dependent upon rpm and torque.

When changing the speed by changing the number of poles, the safest method is to change to a lower speed or greater number of poles. As for example, from 4 to 6, 4 to 8, 6 to 12, etc. The reason for this caution is that the total flux and air gap magnetic density remain practically the same, but the density in the core under the teeth and slots changes with the number of poles. Thus changing from a four-pole to a two-pole winding would double the density in this area, but changing from 4 to 6, etc., would reduce the density.

The rotor end ring resistance may require adjustment to maintain correct starting torque when changing to a lower speed, as the number of parallel circuits are increased with a larger number of poles. When increasing the speed, the peripheral speed of the rotor must be checked to keep it within normal conditions.

More detailed data on speed and frequency changes are contained in two McGraw Hill Co. books "Connecting Induction Motors," by A. M. Dudley, and "Rewinding and Connecting A. C. Motors," by Braymer and Roe.

Connecting Diagrams for Lap-Wound Motors

This article presents the twelve-pole, three-phase, four-parallel, three-lead, star and delta connecting diagrams, and the twelve-pole, three-phase, nine-lead, six or twelve parallel star and delta con-

nections for lap-wound a-c motors.

The twelve-pole, three-phase, three-lead, four-parallel star connecting diagram is shown in Fig. 65. This connection requires three lead rings, each with four taps to it. In addition, there are twenty-four short pole phase group jumpers, and one star ring with twelve taps to it.

It requires only a few minor changes to convert the four-parallel star connection of Fig. 65 to a four-parallel delta connection. The first step being to cut open all connections to the star ring and to remove it from the winding. This leaves the jumpers from groups 7-16-25-34 in the A-phase open. These should all be connected to the C ring. Next connect the open ends of groups 9-18-27-36, in the C phase, to the B ring. Then the open ends of groups 5-14-23-32 in the B phase are connected to the A ring. The small schematic diagram included with each connection diagram provides an easy and simple means of checking changes in type of connections.

The twelve-pole, three-phase, three-lead, four-parallel delta connection is shown in Fig. 66. This connection has three lead rings, each with eight taps to it, and eight short pole phase group jumpers.

To change the four-parallel delta connection of Fig. 66 to a four-parallel star connection, the first step is to cut open the jumpers from groups 7-16-25-34 from the C ring, cut the jumpers from groups 9-18-27-36 to the B ring, and cut the jumpers from groups 5-14-23-32 to the A ring. Next add a star ring and connect all the open jumpers to it, making a total of twelve taps.

Dual Voltage Connection

The twelve-pole, three-phase, nine-lead, six or twelve parallel star connecting diagram is shown in Fig. 67. This connection requires ten rings, consisting of nine lead rings each with six taps and one star ring that has eighteen taps to it.

To convert Fig. 67 to a nine-lead, six and twelve parallel delta connection for twelve-poles, three-phase, we must eliminate the star ring. The star connections from groups 4-10-16-22-28-34 are connected to the C-line lead ring. Then the star connections from groups 6-12-18-24-30-36 are connected to the B-line lead ring. To complete the change, we take the

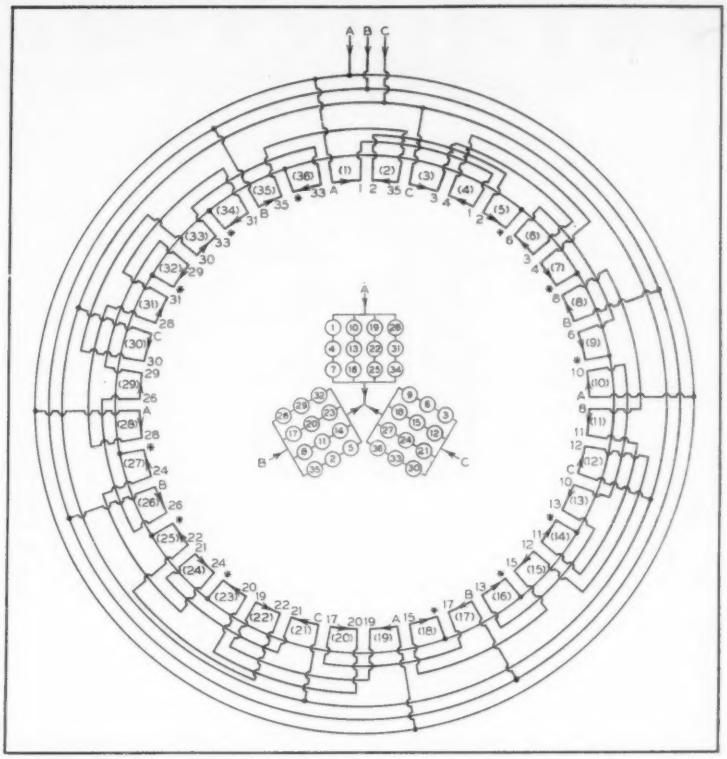


Fig. 65. Four-parallel star connection for 12-pole, three-phase lap-wound induction motor with three leads.

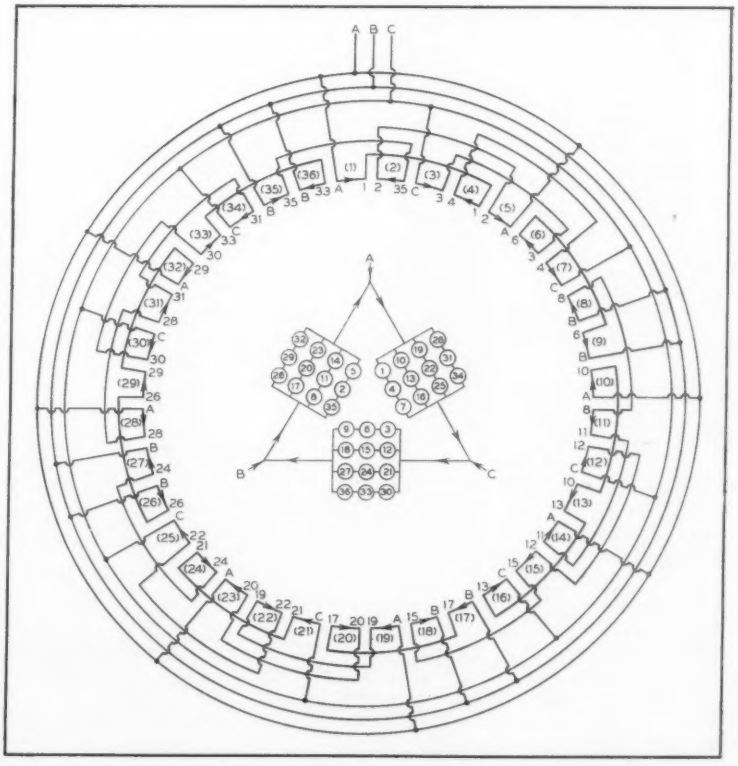


Fig. 66. Four-parallel delta connection for 12-pole, three-phase lap-wound induction motor with three leads.

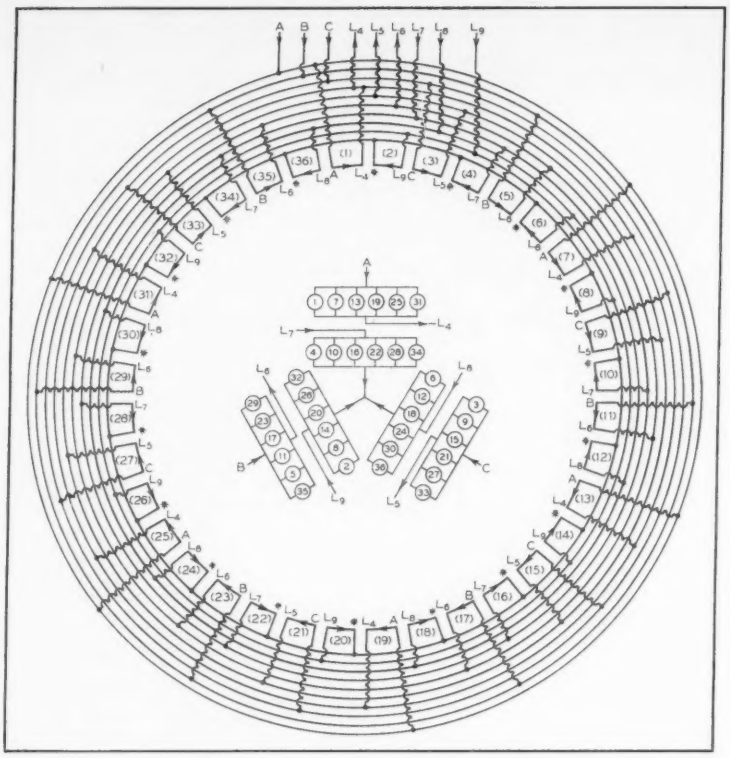


Fig. 67. Six or twelve parallel star connection for 12-pole, three-phase, lap-wound induction motor with three or nine leads.

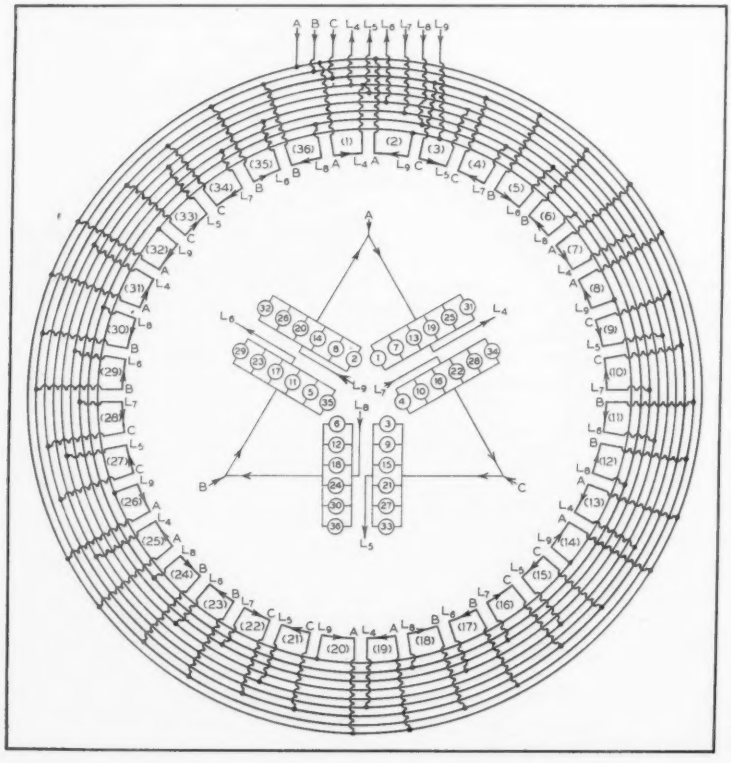


Fig. 68. Six or twelve parallel delta connection for 12-pole, three-phase, lap-wound induction motor with three or nine leads.

star connections from groups 2-8-14-20-26-32 and connect them to the A-line lead ring.

The twelve-pole, three-phase, nine-lead, six or twelve parallel delta connection is shown in Fig. 68. This connection requires nine lead rings. The three rings, A, B and C, each have twelve taps, while the other six rings each have six taps. Thus for this connection the star taps are divided among the three A, B and C lead rings.

To convert Fig. 68 into a twelve-pole, three-phase, six and twelve parallel star connection, we must add a tenth or star ring. To accomplish this we disconnect the taps from the C-line lead ring from groups 4-10-16-22-28-34; likewise disconnect the taps from the B-line lead ring from groups 6-12-18-24-30-36; then disconnect the taps from the A-line lead ring from groups 2-8-14-20-26-32. This leaves eighteen taps connected. Adding the tenth ring and connecting all eighteen taps to it forms the star ring and converts the connection to six or twelve parallel star.

(Readers are invited to send their motor problems to the editor who will endeavor to obtain assistance for them promptly. Obviously, problems involving extensive redesign cannot be answered. Rewinding data on many of the most popular type of motors is available.)

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Table 2

Dual Voltage Connection For 3-Phase Star

For High Voltage: Connect A, B, and C to lines; connect L_4 to L_7; connect L_5 to L_8; and connect L_6 to L_9.

For Low Voltage: Connect A and L_7 to A-phase line; connect C and L_8 to C-phase line; connect B and L_9 to B-phase line; and connect L_4, L_5, and L_6 together.

Dual Voltage Connection For 3-Phase Delta

For High Voltage: Connect A, B, and C to lines; connect L_4 to L_7; connect L_5 to L_8; and connect L_6 to L_9.

For Low Voltage: Connect A, L_7, and L_6 to A-phase line; connect C, L_8, and L_4 to C-phase line; and connect B, L_9, and L_5 to B-phase line.

NEWS of the INDUSTRY

Certified Appliance Repair Shops Sponsored by Utility

A dealer-utility cooperative service plan, believed to be the second such plan put into effect, has been in operation in New Orleans for several weeks and dealers are well pleased with the plan, according to officials of the New Orleans Public Service, Inc., which inaugurated it.

Under this plan, the utility will eventually eliminate its service department, turning this over entirely to the dealers, and has taken the first steps in this direction by retiring its service department from the first floor to the basement.

The plan provides for establishment of "Certified Appliance Repair Shops" at strategic locations in all parts of the city after the owners of these shops have convinced the utility officials that their mechanics are capable of handling repairs which may be referred to them.

In some instances this meant training workmen especially in the servicing of somewhat more complicated appliances. Meetings or schools were held at which instructions in these servicing jobs were discussed and a series of advertisements were published—all at the expense of the utility—urging householders not to discard contrariwise toasters or other appliances, but to have these repaired at one of the 22 "Certified" repair shops.

After the shops were designated and had stocked necessary parts their names and locations were advertised by the utility in newspapers and in enclusures with utility bills and other direct mail.

First few weeks of operation of the plan have developed a few kinks, said E. N. Avegno, dealer sales division manager for New Orleans Public Service, and these were to be worked out at one or perhaps several meetings with the dealers which were scheduled for late in October.

One of the first troubles developed was a shortage of repair parts and inability of the dealers to obtain priorities for these. The utility came to their aid in most of these instances and supplied the parts at cost from stocks it had accumulated.

After outlining the plan to dealers at a meeting at which he explained that the proposal offered the dealers an opportunity for more appliance sales through these repair contacts in addition to profit from the service work, Mr. Avegno told them of the groundwork the utility would do.

This was carried out and included a series of newspaper teaser ads in which the repair of faulty electrical appliances as urged on the public and later large proportions of the idea in four-column advertisements, radio spot announcements, and even in movie trailer appeals. In many of these the names and addresses of the 22 dealers finally chosen were listed.

The utility also presented each dealer a metal sign in the form of a seal with an oblong sign across this reading "Certified Electric Appliance Repair Shop." This sign was in red, black and yellow.

In accepting these, the appliance repair shop owner agreed to maintain a capable mechanic for all usual working hours qualified to service appliances and to make reasonable charges for such work.

"In the first few weeks of operation the plan has been favorably received and the dealers appear well pleased," said Mr. Avegno.

A recent proposal of E. J. Jeffe, vice president of the New York Consolidated Edison corporation for a joint super service organization of repair organizations for metropolitan New York is declared to be different from the New Orleans plan inasmuch as the New Orleans utility will have no interest or control in the dealer-repair shops other than to assist them.

Wait! DON'T SMASH IT..
LET A CERTIFIED ELECTRIC APPLIANCE REPAIR SHOP FIX IT!
LOOK FOR THIS SIGN IN YOUR NEIGHBORHOOD
CERTIFIED REPAIR SHOP
THIS SIGN IS YOUR GUARANTEE of
Efficient Workmanship
High Grade Parts
Reasonable Prices
Courteous Treatment
Swift Service.

New Orleans Public Service distributed this mailing piece with consumer statements to introduce the "certified appliance repair shops."

McGraw Contractors Award Presented to McChesney

Robert W. McChesney, vice chairman of Harry Alexander, Inc., Washington, D. C., received the James H. McGraw Award Contractors Medal for 1941. It was given "in recognition of his contribution to the advancement of the contracting branch of the electrical industry through his personal effort and industry leadership in preventing the absorption of electrical construction by general contractors on National Defense Work, by securing government endorsement for the economic function of the specialized subcontractor." The presentation was made during the convention of the National Electrical Contractors Association in Houston, on October 8th.

Mr. McChesney, who has served as president of NECA for the past two years was reelected at the concluding session.

Monroe Heads Florida Association of Contractors

The executive committee of the Florida Association of Electrical Contractors and Dealers held a special meeting at the McAllister Hotel in Miami, Monday, September 29, 1941. Called for the purpose of taking action upon several pieces of important business, the meeting made it possible for executive committeemen to also attend the annual meeting of the Southern Section, International Association of Electrical Inspectors.

One of the first items scheduled for consideration at the executive committee meeting was a letter of resignation from President W. O. Henderson, Jacksonville. The executive committee accepted Mr. Henderson's resignation. This action automatically made Vice-President W. S. Monroe, of Tampa, president for the unexpired term.

Also considered at the meeting was the resignation received from Harold Lang, of Orlando, executive committeeman. Mr. Lang's resignation was accepted with deep regret and with an expression of appreciation for his past activities and the services he had rendered the association.

To fill the vacancies created by resignations, Fred Stewart, of Miami, was elected vice-president to succeed Mr. Monroe, and J. J. Newell, of Orlando, was elected to fill the unexpired term of executive committeeman from District No. 3. O. V. Scott, of Miami, was elected to succeed Mr. Stewart as executive committeeman in District No. 6.

The executive committee accepted an invitation to hold the 1942 spring convention in Miami, the date and place to be announced later.

Assn. of Electrical Leagues Meets in Washington

"League Responsibilities in the National Emergency" is the theme of the Sixth Annual Conference of the International Association of Electrical Leagues, to be held at the Hotel Raleigh, Washington, D. C., Wednesday to Friday, November 12 to 14, inclusive.

The Program Committee, appointed by J. S. Bartlett, managing director, Electric Institute of Washington, and president, I.A.E.L., has sensed the needs of the present emergency and has worked out a program designed:

(1) To increase the effectiveness of the leagues in the current situation, and,

(2) To outline ways and means for planning now to aid post-war business.

The morning and afternoon sessions of Wednesday, November 12, will be devoted to a discussion of "New Developments in the Adequate Wiring Program for Home Building Under Priorities." Discussion leaders will be men who have had practical experience in their own communities in aiding builders and the electrical industry in meeting the situation imposed by the recent announcements of the OPM and SPAB.

In the evening, there will be a reception and dinner meeting, to which will be invited key men from the various governmental agencies concerned with housing problems, who will be asked to present brief details of the operations for which they are responsible with a view of aiding league managers and others in interpreting rulings in the interests of the various branches of the electrical industry.

The entire day of Thursday, November 13, and the morning of Friday, November 14, will be used to explore every phase of league operation in keeping with the main theme of the conference. The subjects to be covered include:

- Cooperative appliance advertising under present conditions
- Keeping specialty appliance dealers in the picture with consideration of possibilities of organizing appliance service bureaus
- Keeping the public electrically conscious. Now is the time to survey the domestic market
- General industry education courses;—their value and how to organize them
- Making a survey of commercial occupancies
- Opportunities for industry promotion of fluorescent lighting
- Special value of electrical maintenance engineers organizations in the emergency
- Possibilities of infra-red for industrial applications
- Specialized training for electricians and service men
- New ideas in home demonstrations

A subject of special interest will be "The Road We've Traveled," to be presented by George W. Austen, manager, Electrical Service League of Toronto, in which he will outline the problems that have been met by the electrical industry in Canada during the two years the country has been at war.

A general forecast of appliance market conditions and dealers' prospects in view of the defense effort will be presented by Arthur Hirose, director of promotion and market research, McCall Corporation.

Business affairs of the IAEL, including reports of officers and divisional chairmen and election of Governors and officers for the ensuing year will be handled on Friday afternoon, November 14.

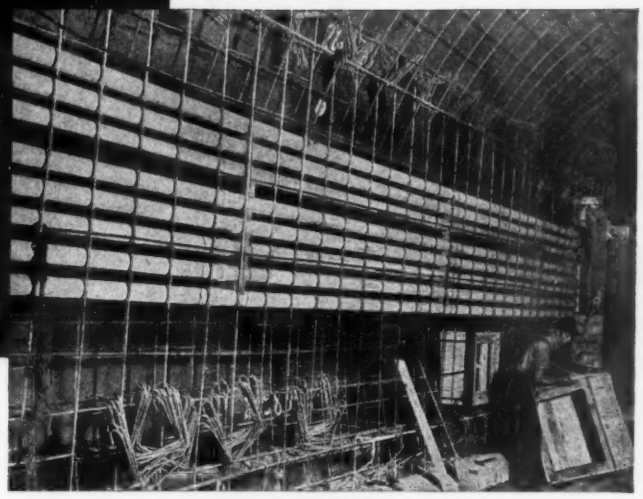
Snapped while attending an executive committee meeting of the Florida Association of Electrical Contractors and Dealers, in Miami, left to right, are R. C. Bigby, Bigby Electric Company, Tampa, secretary and treasurer; S. W. Shaw, Shaw Electric Company, Tampa; and W. S. Monroe, Monroe Electric Company, Tampa, newly elected president of the association.

New Crosley Distributor

Major Appliances, Incorporated, at 2414 South Lisbon Avenue, Tampa, Florida, has been granted a franchise as distributor for The Crosley Corporation in its area.

An Important Factor in

REDUCING DISTRIBUTION COSTS...



BANKHEAD VEHICULAR TUNNEL, Mobile, Ala. In this recently completed tunnel, 40,000 feet of J-M Transite Korduct are used to carry power cables. *General Contractors:* Arundel Corp., Baltimore, Md. *Electrical Contractors:* Miller Electric Co., Jacksonville, Fla.

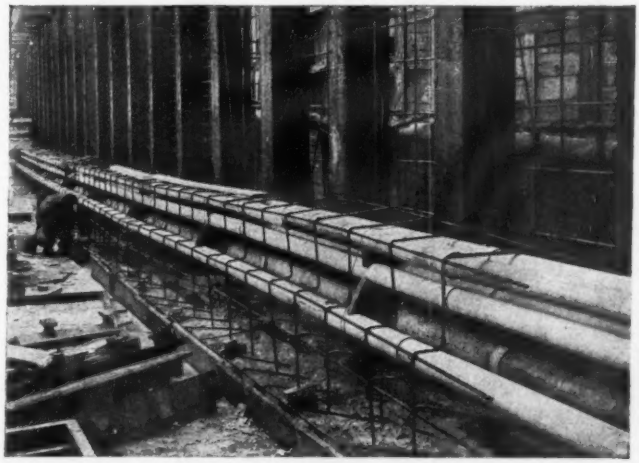
TRANSITE KORDUCT—made of asbestos and cement—helps keep maintenance and operating costs permanently low

Wherever a duct system must be "concreted-in," there you will find worth-while economies possible with J-M Transite Korduct.

Installation goes faster and costs less, for this modern duct is light in weight . . . easy to handle and assemble. Its long lengths line up accurately . . . minimize the number of joints required in the line.

And these savings are further increased year after year. Being fireproof and rotproof, Transite Korduct seldom requires maintenance. Its asbestos-cement composition provides a high rate of heat dissipation. Cables run cooler . . . copper losses are reduced. As a result, the carrying capacity of the system is markedly increased and the system will show a greater return per dollar invested.

You will want to keep all the facts on file. Write for brochure D. S. 410. Johns-Manville, 22 East 40th Street, New York, N. Y.



MADE OF ASBESTOS AND CEMENT, Transite Korduct will not burn. It never contributes to the formation of combustible or explosive fumes. And because it is rotproof, maintenance costs stay low.

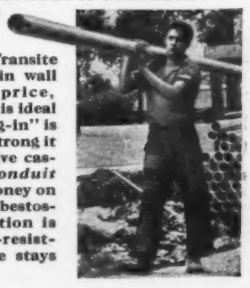
JM Johns-Manville

TRANSITE DUCTS

TRANSITE KORDUCT . . . for installation in concrete.

TRANSITE CONDUIT . . . for exposed work and for installation underground without concrete encasement.

AND FOR USE WITHOUT A CONCRETE ENVELOPE—J-M Transite Conduit



Identical with Transite *Korduct*, except in wall thickness and price, Transite *Conduit* is ideal where "concreting-in" is not specified. So strong it needs no protective casing, Transite *Conduit* saves time and money on every job. Its asbestos-cement composition is highly corrosion-resistant; maintenance stays permanently low.

J. J. Crouch
ALBUQUERQUE NORGE, INC.
Albuquerque, N. M.

W. H. Custis
THE ARNOLD WHOLESALE CORP.
Cleveland, O.

E. O. Hunting
THE AUTO EQUIPMENT CO.
Denver, Colo.

W. M. Wood
AUTOMATIC SALES CORP.
Houston, Tex.

S. J. Levy
BERGMAN-NORGE CO.
Buffalo, N. Y.

E. D. Henley
BIRMINGHAM ELEC. BATTERY CO.
Birmingham, Ala.

B. S. Gambill
BRAID ELECTRIC CO., INC.
Nashville, Tenn.

F. M. Bultman
CAIN & BULTMAN, INC.
Jacksonville, Fla.

J. T. Morgan
CHARLESTON ELEC. SUPPLY CO.
Charleston, W. Va.

C. H. Clemons
CLEMONS BROS. CO.
Chattanooga, Tenn.

E. A. Johnston
COLUMBIA ELEC. & MFG. CO.
Spokane, Wash.

Harry Knodel
THE COMPTON-KNODEL DIST. CO.
Cincinnati, O.

K. Connelly
F. B. CONNELLY CO.
Seattle, Wash.
Portland, Ore.

W. E. Seaton
BENJ. T. CRUMP CO., INC.
Richmond, Va.

Here's Our Promise to Every Norge Dealer

WE ARE NOW nearing the end of one of the best years in our history as Norge distributors and it is with sincere appreciation that we salute you, our dealers, and acknowledge the part you have played in making this a most successful year.

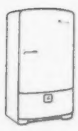
As you all know, there are conspicuous advantages attached to the Norge franchise and one of the most important is the advantage you enjoy in doing business through a distributor who, like yourself, is an independent business man with interests exactly like your own.

We know that you must have merchandise to make sales and profits. So must we. We know that you, and we, are fortunate in that the Norge line includes Refrigerators, Washers, Gas Ranges, Electric Ranges and Home Heaters, and, in addition, a complete line of Commercial Refrigerators, Water Coolers and Beverage Coolers.

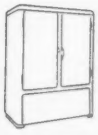
Therefore, while we all accept the prospect of necessary curtailment of volume in each one of these products, we also recognize the fact that each of us will get his fair share of any available quantity of these many diversified products. We have this promise from Howard E. Blood, President, Norge Division, Borg-Warner Corporation.

To that promise we add our own promise that in 1942 we will think harder and work harder to make Norge more than ever "Something solid to tie to"—now, and later.

The Norge Distributors



ROLLATOR REFRIGERATION



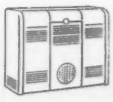
COMMERCIAL REFRIGERATION

RO-TA-TOR WASHERS

SPIRO-SPEED GAS RANGES

A PRODUCT OF BORG-WARNER

ELECTRIC RANGES



OIL-BURNING HOME HEATERS

Something Solid to Tie to...

NORGE

NORGE DIVISION BORG-WARNER CORPORATION
670 E. WOODBRIDGE STREET, DETROIT, MICH.

R. F. Healy
ERSKINE-HEALY, INC.
Rochester, N. Y.

C. Olesen, Jr.
THE FARRAR BROWN CO., INC.
Portland, Me.

J. M. Bloch
THE GIBSON CO.
Indianapolis, Ind.

Ludwig Hommel
LUDWIG HOMMEL & CO.
Pittsburgh, Pa.

W. D. V. Hopkins
HOPKINS EQUIPMENT CO., INC.
Atlanta, Ga.

H. P. Meyer
IMPERIAL HARDWARE CO., INC.
El Centro, Calif.

Russell Lyle
LYLE-CRENSHAW, IN
Memphis, Tenn.

L. J. McAllister
M. & M. APPLIANCE CO.
Boston, Mass.

E. H. Krohn
ALBERT MATHIAS & CO.
El Paso, Tex.

M. B. Lasky
MAYFLOWER SALES CO.
St. Louis, Mo.
Kansas City, Mo.
Wichita, Kan.

F. W. Hammer
A. Y. McDONALD MFG. CO.
Sioux City, Ia.

V. J. McGranahan
V. J. McGRANAHAN DIST. CO.
Toledo, O.

William Mee, Jr.
WILLIAM MEE CO., INC.
Oklahoma City, Okla.

A. H. Meyer
LEO J. MEYBERG CO., INC.
San Francisco, Los Angeles, Calif.

C. A. Rahn
MIDLAND IMPLEMENT CO., INC.
Billings, Mont.

Mark Lintner
MUTUAL DISTRIBUTORS, INC.
Columbus, O.

Geo. Lehleitner
NORGE PRODUCTS CO., INC.
New Orleans, La.

W. C. Rowles
NORGE SOUTHWEST SALES CO.
San Antonio, Tex.

Dave Burke
RADIO DISTRIBUTING CO.
Detroit, Mich.
Grand Rapids, Mich.

A. C. Reinhard
REINHARD BROS. CO., INC.
Minneapolis.
Aberdeen, S. D.
Fargo, N. D.

W. H. Roth
ROTH APPLIANCE DIST., INC.
Milwaukee, Wis

Chas. L. Wheeler
SALT LAKE HARDWARE CO.
Salt Lake City, Utah

Peter Sampson
SAMPSON ELECTRIC CO.
Chicago, Ill.

John Selle
SELLE-WILSON CO.
Little Rock, Ark.

C. L. Carper
SIDLES CO.
Omaha, Neb.
Des Moines, Ia.

J. H. Northey
SOUTHERN BEARINGS & PARTS CO.
Charlotte, N. C.

W. E. O'Connor
SOUTHERN WHOLESALERS, INC.
Washington, D. C.
Baltimore, Md.

B. H. Spinney
B. H. SPINNEY CO.
Springfield, Mass
Albany, N. Y.
Syracuse, N. Y.

F. L. Wallace
SUMMERS HDWE. & SUPPLY CO.
Johnson City, Tenn.

Geo. Buechel
THE SUTCLIFFE CO., INC.
Louisville, Ky.

W. J. Schnelle
TEXAS WHOLESALERS
Dallas, Tex.

T. S. Deyerle
THURMAN & BOONE CO., INC.
Roanoke, Va.

Dave Trilling
TRILLING & MONTAGUE
Philadelphia, Pa.

E. G. Turner
TURNER DEPT. STORE CO.
Springfield, Mo.

C. B. Warren
WARREN NORGE CO., INC.
New York, N. Y.

Virginia Public Service Executives Promoted

Howard L. Crumley was appointed operating vice president of the Virginia Public Service Company, it was announced by W. E. Wood, president of the company. Mr. Crumley formerly was the Company's Superintendent of Operations. Simultaneously Mr. Wood announced the appointment of Ivan Buys to Mr. Crumley's former position as Superintendent of Operations.

H. L. Crumley

Mr. Crumley will have direct supervision over the Company's operations; Mr. Buys will supervise the Company's generating, transmission and distribution facilities.

Like his senior officer, Mr. Wood, Mr. Crumley is a graduate of Georgia Tech, Class of 1920. He is a Registered Professional Engineer in the states of Virginia, West Virginia, New York and Pennsylvania. He is a member of the American Institute of Electrical Engineers and served as manager of that organization at Reading, Pa. With his appointment as vice-president at the age of 41, he becomes one of the youngest utility executives in the South.

"We have selected Mr. Crumley as operating vice president because of his excellent record since he became connected with the Virginia Public Service Company, and because he is eminently qualified by his experience and ability for the very important task of supervising the operations of the business which are expanding rapidly because of national defense activities. The company has faced and is facing many perplexing problems of finance and construction. These must be and will be solved. In the meantime, we must operate the system efficiently under difficult conditions."

He is a native of Georgia, where he received his primary and college education, having finished with a degree in Electrical Engineering from Georgia Tech in 1920. After graduation, he spent one year with the General Electric Company at Schenectady, New York. In 1921, he joined the Georgia Power Company, Atlanta, Georgia. Four years later, he became associated with the Metropolitan Edison Company, a large utility operating in Eastern Pennsylvania, with headquarters at Reading. After serving as a relay engineer, he was appointed assistant superintendent of operations and later chief system operator. In 1927, he was made assistant superintendent of operations. In 1937, he became consulting engineer to the E. M. Gilbert Engineering Corporation of Reading, Pa., specializing in construction, maintenance and operation. He joined the Virginia Company as superintendent of operations in 1938.

Mr. Buys is a graduate of Cornell University in Mechanical and Electrical Engineering. He served in the U. S. Army from 1917 to 1919. After World War I, he joined the Duquesne Light Company as chief of operations. In 1923, he was made superintendent of transmission of the Kansas Gas and Electric Company, and in 1930, chief engineer of United Power and Light Corp., of Kansas, and later division manager. In 1936, he was engaged by the Illinois-Iowa Power Company, Decatur, Illinois, as chief engineer to reorganize the engineering department. It was from this company that he came to Virginia.

J. T. Persons Named Vice President of CPL

James T. Persons, chief electric and water engineer of Central Power and Light Company, becomes vice-president of the company as a result of action by the board of directors, Lon C. Hill, CPL president, announced early this month.

Mr. Persons has headed the utility firm's engineering department for the past 14 years during which time he has supervised many large construction projects as well as bearing responsibility for operations. Prior to his connection with CPL, Mr. Persons was empolyed by Texas Power and Light Company, of Dallas, for a 14-year period.

The new vice-president took his first job with General Electric Company at Schenectady, New York, where he learned much of the technical side of the electric business. He then went to Des Moines, Iowa, to supervise the underground distribution operation for the Illinois Traction System.

A former star tackle on the football team at the University of Texas, he was graduated from that institution's electrical engineering school in 1911.

Advancements Announced for Tennessee Utility Men

Louis H. Phetteplace, Jr., is the new manager of the Bristol Division of East Tennessee Light & Power Company, according to announcement made by Chas. E. Ide, president of the utility. Other promotions and transfers advanced John K. Davis, formerly distribution superintendent of the Greeneville Division to manager of the Erwin Divison, and Charles C. Strozier, formerly supervisor of distribution engineering in the general offices, to the position of distribution superintendent in the Greeneville Divison. All changes become effective October 15th.

Mr. Phetteplace has been connected with the utility industry since 1920 when he became local manager of the former Erwin Electric Light & Power Co., which was

L. H. Phetteplace, Jr.

purchased and made a division of East Tennessee Light & Power Company in 1929.

Mr. Davis was a graduate and high-honor man at V.M.I., receiving his engineering degree in 1929. Following his graduation, he spent a year in the Doherty cadet school before joining East Tennessee

Light & Power Company in the general engineering department.

Mr. Strozier is a native of Cordele, Ga., and received his engineering degree at Alabama Polytechnic Institute. After completing the course of training in the Doherty cadet school, he joined the general engineering department of the Company, serving in both the Johnson City and Bristol divisions.

Supply Company Executive Called to Duty with Navy

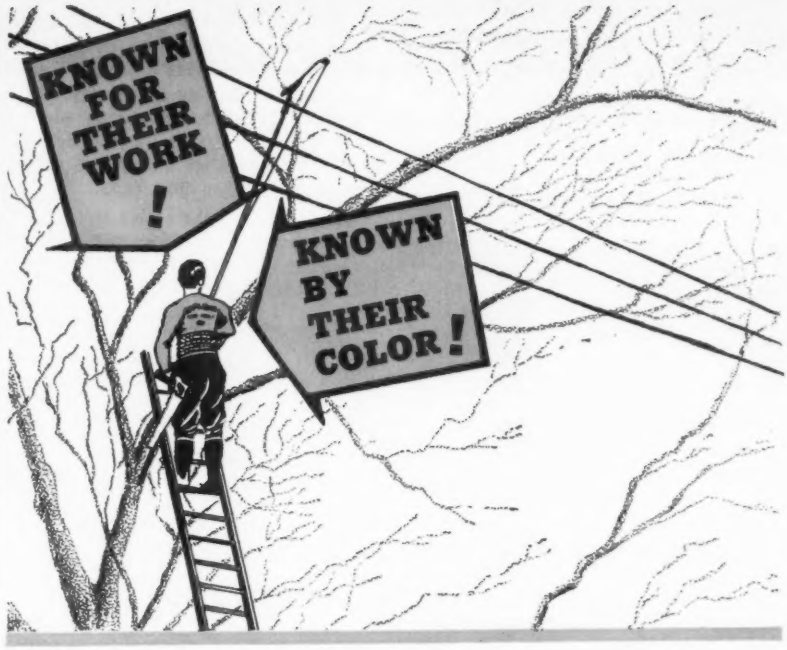
Robert A. Robertson, vice-president of Robertson Supply Company, Orlando, Fla., wholesale distributors of electrical appliances and commercial lighting fixtures, has been called into service as Ensign in the United States Navy. Mr. Robertson has reported to Norfolk, Va., where he will embark soon for Panama Canal Zone.

The Robertson Supply Company will continue operations, of course, under the direction of L. M. Robertson, president and treasurer.

Wholesale Business Established by Goforth

Charles I. Goforth, of Gainesville, Ga., recently established a wholesale electrical business under the name of Goforth Electrical Supply Company. The new firm will serve northeast Georgia. Previous to engaging in the wholesale business, Mr. Goforth has operated an electrical contracting business in Gainesville for nearly 30 years.

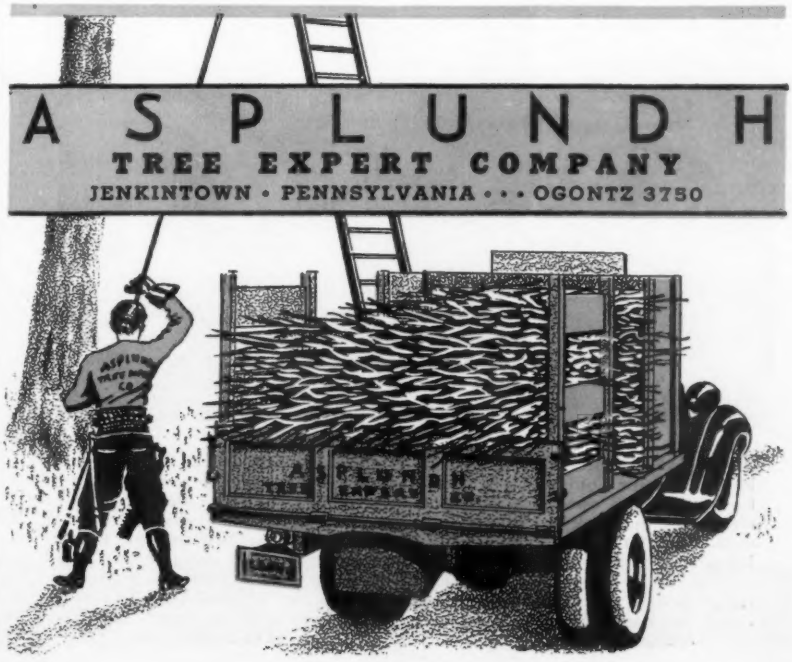
ACTION LIGHT DISPLAY — This action display is one of several prepared by the National Better Light-Better Sight Bureau as a part of its 1941-42 promotional campaign. The "Professor's" arm with pointer moves up and down, directing attention to each word in turn. His eyes roll. At tip of pointer is a lighted bulb.



THESE brilliant-hued "bird men" prevent tree-interference with power lines — *scientifically!* They are thoroughly schooled in the art of *trimming* trees — not defacing them — *saving* trees — not killing them — and protecting power lines, first, last and all the time.

Inquiry at any office at the right will amaze you with the dispatch and low cost of this expert, highly specialized service. Keep your line OPEN!

Chicago, Ill. Randolph 7773
Binghamton, N. Y. Binghamton 4-5314
Columbus, Ohio Adams 1432
Alexandria, Va. Alexandria 3581
New Castle, Pa. New Castle 2265
Rutherford, N. J. Rutherford 2-7434
Pittsburgh, Pa. Atlantic 9798
Washington, D. C. Shepherd 5249
Baltimore, Md. Glenburnie 790J
Cambridge, Mass. Kirkland 5330
Durham, N. C. Durham X5544
Omaha, Neb. Atlantic 8305



Power Use Curtailment Anticipated for Southeast

Definite curtailment in use of power in Georgia, Alabama and Tennessee may be necessary within two weeks unless water supplies are replenished by heavy rainfall, Leland Olds, chairman of the Federal Power Commission, said recently.

Addressing public utility commissioners and power operators of seven Southern states, he said surveys indicated that the three states mentioned have a possible drawdown in reservoirs until October 26.

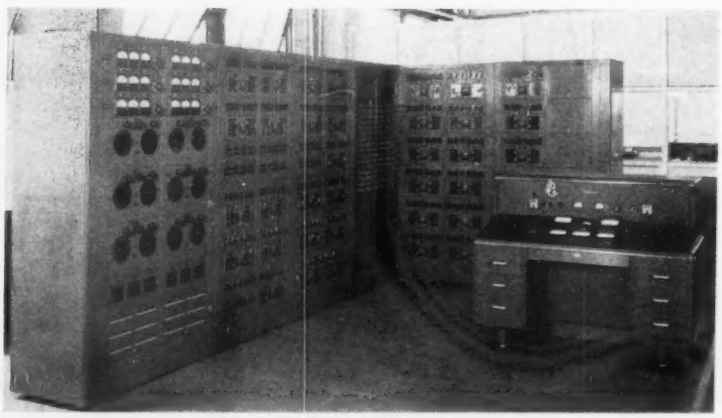
"There appears to be a bare two weeks' supply in Commonwealth and Southern reservoirs without some definite curtailment," he added.

The federal power chairman took over the meeting after utility commissioners of the seven states, in a separate session, voted to name a committee to consider possible pooling of all Southeastern power, including that distributed by the Tennessee Valley Authority.

The Federal Power Commission announced on October 22 its order directing the Duke Power Company to deliver increased quantities of electric energy for defense production to the Carolina Aluminum Company's plant at Badin, North Carolina, and to the Tennessee Valley Authority. The order, which was issued under authority conferred by Section 202 (c) of the Federal Power Act, also approves previous arrangements made by Duke Power Company for the delivery of power to Carolina Aluminum Company and the Tennessee Valley Authority and directs that such deliveries shall be of the same effect as if ordered by the Commission under the provisions of Section 202 (c).

"As a result of the order announced today and more effective pooling arrangements initiated during the Atlanta conference on October 14 with State Commission and utility officials," said Chairman Leland Olds, "it appears probable that no curtailment in the use of power by non-defense consumers of the Tennessee Valley Authority and the Commonwealth & Southern companies in the area will be necessary before November 10. This order, combined with closed cooperation on the part of utility systems in the hourly dispatching of power and new arrangements among the utilities requested by the Commission, has resulted in increasing energy supplies to the TVA and the Commonwealth & Southern companies from the power pool initiated by the Commission last May to meet the emergency from about 29 million to 36 million kilowatt-hours a week, or 25 percent. Thus one of the objectives of the Atlanta conference, the postponement of power rationing in the area beyond November 3, if possible, has been accomplished to the extent of one week. If water conditions improve between now and Nov. 10, further postponement may be possible."

"In the interim," Chairman Olds continued, "credit must be given to the Duke Power Company for assuming the heavy burden imposed on its facilities in helping to keep defense production in the area on schedule by contributing some 18,800,000 kilowatt-hours per week to the power pool."



POTOMAC ENGINEERS GET CALCULATOR—Engineers at the Potomac Electric Power Company will soon have a powerful tool to assist them in the design and operation of their electrical system. The device, a 110 circuit a-c network calculator built by Westinghouse, is now being installed in Potomac Electric's engineering offices, in Washington, D. C. Eliminating the necessity of ponderous mathematical calculations, the system can be quickly altered to study a number of conditions in a very short period. It will be particularly useful in determining the most economical method of connecting a new transmission line and in simulating the effect of tap-changing transformers and condensers.

Mississippi Construction Expenditures Announced

The Mississippi Power Company will spend approximately $2,850,000 in power line and auxiliary plant construction work in South Mississippi, it was announced recently. These power facilities are needed to meet new defense requirements, and the financing plan has been approved by the Securities and Exchange Commission.

One of the major items in the construction program will be 37 miles of 110,000 volt wood pole transmission line from the company's 110,000 volt system near Gulfport to the Mississippi-Louisiana state line, where the line will connect with a similar line to be constructed by the New Orleans Public Service Inc., and the Louisiana Power and Light Company.

Also a 20,000 kilowatt steam electric generating plant is to be constructed near Hattiesburg, together with a 25,000 kilovolt ampere step-up substation and the necessary 110,000 volt line to connect this new plant to the company's existing 110,000 volt line connecting Meridian, Laurel, Hattiesburg and Gulfport.

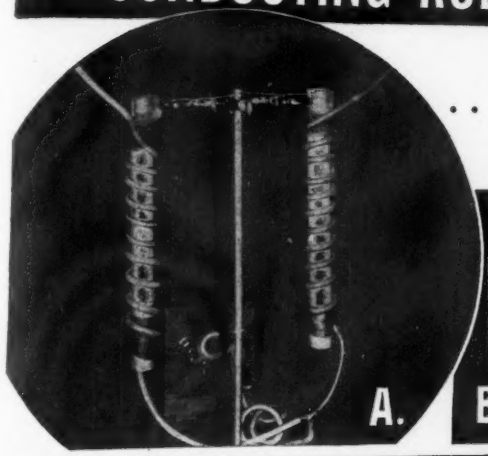
Business Consultant Appointed to Serve Southeastern States

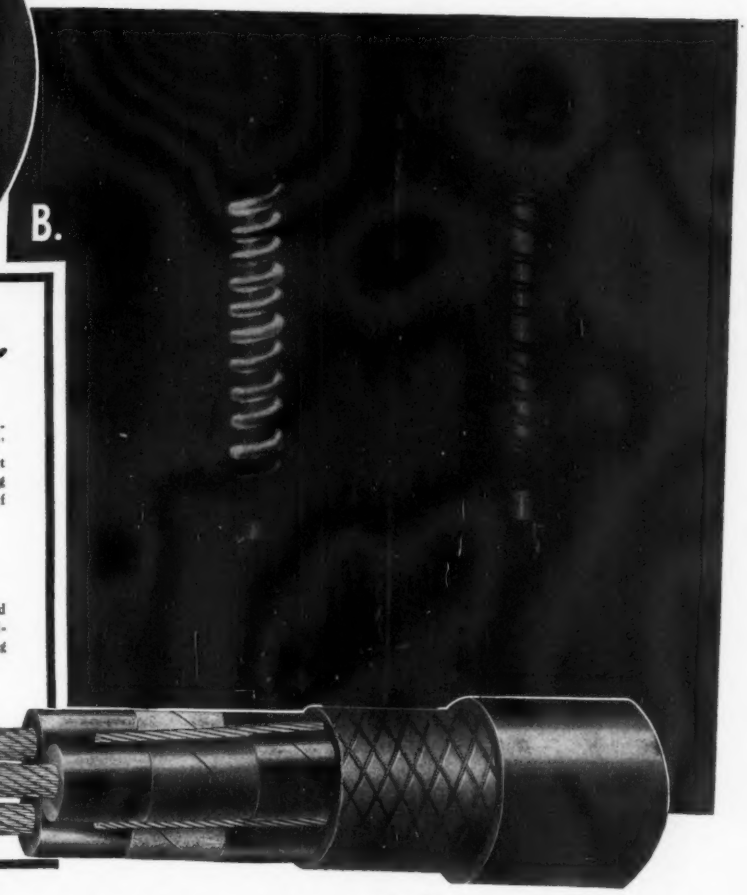
Roscoe Arant, regional business consultant recently appointed by Secretary Jesse Jones, of the United States Department of Commerce, at Washington, has assumed duties in the offices of C. P. Persons, regional manager of the United States Department of Commerce in Atlanta.

In the company of Regional Manager Persons, Mr. Arant will make a tour of the states of Georgia, Florida, Alabama and parts of Tennessee, Mississippi and Louisiana. They will visit the district offices of the United States Department of Commerce in Savannah, Georgia; Jacksonville, Florida; Birmingham, Alabama; and New Orleans, Louisiana.

CONDUCTING RUBBER makes it possible . . .

Makes any cable insulation "Corona proof" . . . dissipates static electricity and adds to the life and safety of POWER CABLES





Look at this test...

A VOLTAGE OFF

Both cables are wrapped around mandrels. The conductor on the left is insulated with "ozone proof" rubber, but not shielded. The conductor on the right has the same type of insulation with a surface covering of CONDUCTING RUBBER—same total thickness of wall in each case.

B VOLTAGE ON

Visible corona appears at the surface of the unshielded conductor on the left. On the second conductor, American Steel & Wire Company's Type PS Semi-Conducting Shielding prevents corona formation.

Amerclad rubber-sheathed shovel cable with Type PS Semi-Conducting Shielding. Note ground wires between shielded conductors.

TYPE PS Semi-Conducting Shielding (conducting rubber), a new development by American Steel & Wire Company, solves an old and troublesome problem in the manufacture of insulated cables. By research and by experience, we have proved that Type PS Shielding completely eliminates the deteriorating effects of corona by preventing corona formation. Besides controlling "electronic ionization of air," it also:

1. Increases the life of power cables and widens the range of applications.
2. Protects against shock hazard by providing a grounded exterior.
3. Prevents electrical disturbances from being radiated from the cable or absorbed by it.

Type PS Semi-Conducting Shielding is always in intimate contact with the cable insulation proper. When used with rubber insulation, it adheres to the rubber and becomes an integral part of its surface. By preventing corona and consequent generation of ozone, Type PS Shielding permits the use of standard rubber insulating compounds for high voltage service. No longer is it necessary to employ oil-base compounds in which some degree of corona-resistance is obtained only by sacrificing such typically rubber-like qualities as tensile strength, elasticity, ability to withstand heat and to resist deformation.

Write today for our technical bulletin and other information.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

MANUFACTURERS' News

Stewart-Warner Corp. Presents 1942 Models

The first public presentation of new 1942 electric refrigerators was made in Chicago at the Edgewater Beach Hotel by Stewart-Warner Corporation, October 15-17, at the 11th annual national convention of the company's refrigerator division.

The 1942 Stewart-Warner refrigerator line presented to the company's distributors included seven new models—three conventional models and four Dual-Temps.

Of impending reductions in refrigerator output Joseph C. Elliff, assistant general sales manager, said, "We already have produced four improved 1942 Dual-Temp refrigerators and three conventional models. Naturally, we deplore the reduced number we can build in the future, but we thoroughly realize the gravity of the OPM priorities situation and are especially anxious to cooperate.

"On the other hand, we feel we are very fortunate to be the producers of the Dual-Temp refrigerator because experience has proved it to be a highly efficient saver on food bills for the housewife. This is indeed nationally important for thrift is the most effective way in which the homemaker can combat today's rising costs of living. In the face of this, we at Stewart-Warner believe the Dual-Temp to be entirely consonant with the Federal government's program of food conservation."

Other speakers at the national convention included Gus Treffeison, assistant manager of the household appliance division, who discussed general policy, distribution, mechanical features and the financing of the 1942 line. A. B. Dicus, vice-president of Hays MacFarland & Company, the advertising agency; C. C. DeWees, advertising manager of the appliance division; and W. E. Macke, assistant, presented the national advertising program, dealer helps and local display plans. C. D. D'Olive, appliance division manager, introduced the new line.

The convention will be brought in replica to distributor salesmen at twenty sub-conventions held throughout the nation prior to November 6. These regional meetings, Mr. Elliff said, will include sales sessions and a service school for refrigeration service men. Each meeting will be conducted by the local distributor and a Stewart-Warner factory representative for the benefit of local dealers.

Universal's new complete matched set of appliances in the "Coronet" pattern offer unusual opportunities for promotion during the Christmas season. The brilliant packages with fiery red bows combined with Christmas display material such as shown here enhance their attractiveness as Christmas gifts. Included in the "Coronet" line is the Coffeematic, a non-automatic toaster, wafflemaker, and grill.

News About People—

Dwight Argo has joined the A. B. Chance Co. as junior salesman under **Bill Moss,** who covers the Southeastern territory, which includes the states of Tennessee, North Carolina, South Carolina, Georgia, Alabama,

Dwight Argo

Mississippi, and Florida. Mr. Argo came to the A. B. Chance Company from the Alabama Power Company where he has been contacting electrical contractors and appliance dealers for a number of years.

* * *

George R. Koeln, 376 Nelson Street, Atlanta, was recently appointed southeastern representative for the Holdenline Company, Cleveland, Ohio, manufacturers of fluorescent lighting fixtures. Mr. Koeln will represent the Holdenline Company in Alabama, Florida, Georgia, North Carolina, South Carolina, and Tennessee.

* * *

Henry F. Barksdale, formerly with Westinghouse Electric Supply Corporation, now represents Day-Brite Lighting, Inc., of St. Louis. Mr. Barksdale is located in Atlanta and will cover the states of Georgia, Alabama and the eastern part of Tennessee for Day-Brite.

* * *

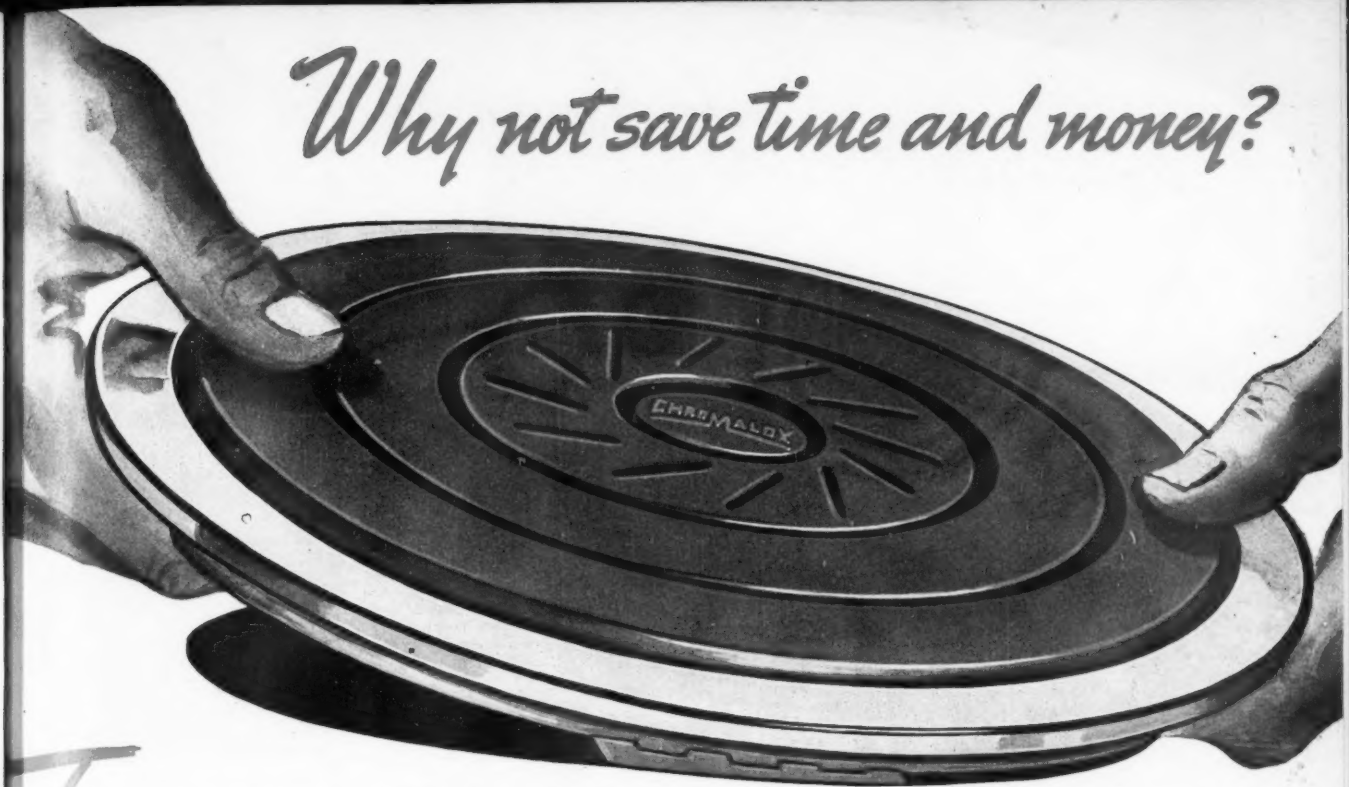
As a means of further improving customer relations and to make possible more frequent personal contact between the Viking Air Conditioning Corp., factory and field representatives, **Frank P. Gibbons** has been promoted to the position of assistant sales manager. In his new capacity Mr. Gibbons will coordinate the activities of the sales and advertising department, and will travel extensively. His advancement will enable **W. E. Van Horne,** vice-president in charge of sales, to devote more of his time to executive duties in the organization.

* * *

Appointment of **Arch Black,** export manager for Norge Division, Borg-Warner Corporation, to the additional post of commercial sales manager, has been announced by **M. G. O'Harra,** vice-president in charge of sales. Simultaneously, Mr. O'Harra announced the appointment of **James Chapman** as assistant commercial sales manager.

Mr. Black is well known in the

Why not save time and money?



For **RANGE UNIT REPLACEMENTS** *use*

CHROMALOX

The unit that fits all ranges

REDUCE INVENTORIES—by stocking Chromalox unit assemblies and inexpensive adaptor rings. Instead of tying up money in a variety of units to meet possible demands, you can fit *any* range with a Chromalox unit.

SAVE SERVICING CALLS—One call does it, if your service man carries a few Chromalox units and adaptor rings. Select the Chromalox unit of the correct rating, click on the required adaptor ring, make a few simple terminal connections—and the job's done!

ASSURE CUSTOMER SATISFACTION—Speedy service builds good will—Chromalox units installed on your customers' range are going to keep right on adding *more* good will. The all-flat top gives greatest contact for cooking food as fast as food will cook—and economically. It is easy cleaning, too.

The TWO-UNITS-IN-ONE gives selective rings of heat to fit large or small utensils. And all these features combine to provide BETTER COOKING as all Chromalox users know.

•

Soon after you've installed a Chromalox unit, check on its performance. You may find more replacement business for the asking.

Write for the book "How to Sell More Ranges."

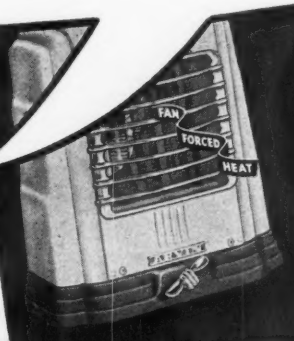
EDWIN L. WIEGAND COMPANY, 7600 Thomas Blvd., Pittsburgh, Pa.

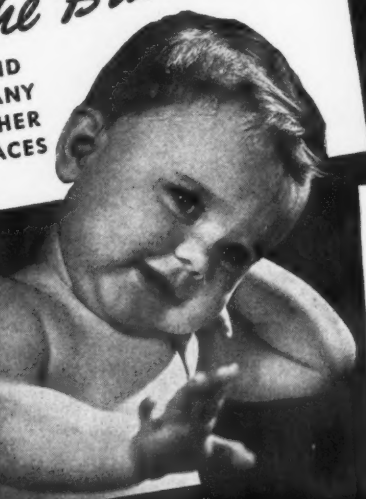
Write us or our nearest representative: ATLANTA, GA. — C. B. Rogers, 1000 Peachtree St. DALLAS, TEXAS — L. R. Ward Co., 303-4 Southland Bldg. Annex • RALEIGH, N. C. — W. B. Phillips

I'm gonna help you sell Arvins this Year!

Essential for the Bathroom

AND MANY OTHER PLACES





● **YOUR BATH ROOM** is not fully equipped without it! Provides fan-forced circulating heat for comfortable bathing, shaving, dressing. Fine for baby's bath—for hair drying, too. When not in use in your bathroom, you may take it to your den, guest-room or game-room. Users say they wouldn't be without it.

● **Just what you need** whenever extra or temporary heat is desired. Thousands used in trailers, camp cottages, small offices, ticket booths and other places. Plugs in any 110 AC wall outlet, 60 cycle. Heating element and fan are safely enclosed in attractive metal cabinet.

● **A splendid gift** for Christmas or weddings. Approved by Underwriters' Laboratories and Good Housekeeping Institute.

Deluxe Model 201A illustrated. Ivory enamel finish, maroon trim. Chrome grille. Toe switch and glow light. 12" tall. Model 201, same design and size with tan finish.

Standard Model 101. Smaller size 10" tall. Green enamel finish.

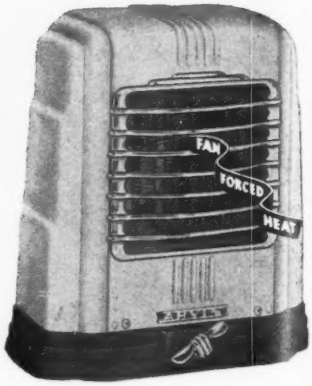
Sold by hardware, electrical, department and other stores. If you don't find it, any model will be sent prepaid on receipt of price.

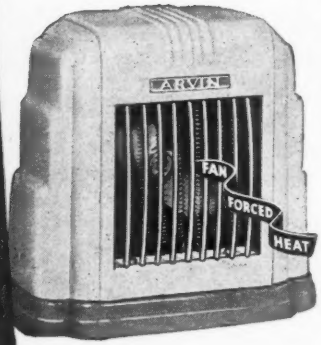
NOBLITT-SPARKS INDUSTRIES, Inc.
Columbus, Ind. *Also makers of Arvin Car Heaters, Radios, and All-Metal Furniture.*

ARVIN
ELECTRIC FAN-FORCED
Circulating Heaters

Consumer Advertising is featuring these Arvin Heaters as essential equipment for bathrooms—for bathing, shaving and dressing. They're sold for many other uses, too.

Thousands Sold every year for trailers, camp cottages, small offices, ticket booths and many other places.





Deluxe Model 201A above. Ivory enamel finish, maroon trim. Chrome grille. Toe switch and glow light. 12" tall. List..... **$12.50**

Model 201, same design and size with tan finish, brown trim. List..... **11.50**

Standard Model 101 at left. Smaller size, 10" tall. Two-tone green enamel. List..... **$9.50**

SALES POINTS FOR YOU TO USE

Warms Air Completely—drawing in cold air from floor, heating it and fan-forcing it into room.

Circulates Heat—employing efficient fan-distributing principle so widely used today.

Portable—plugs in any 110 AC, 60 cycle outlet. Safe with children. Motor does not interfere with radio.

EFFECTIVE CONSUMER ADVERTISEMENTS LIKE THE ONE ABOVE...

are appearing in all the leading national magazines shown at left—reaching millions of people—helping you to sell the many prospects in your community.

● Dealers are selling more Arvins than ever before—because the market is bigger and more receptive. More people appreciate the need for an Arvin—and more are able to buy. So don't miss this opportunity for extra profit. Order your stock from an Arvin jobber.

NOBLITT-SPARKS INDUSTRIES, INC., COLUMBUS, INDIANA

ARVIN FAN-FORCED *Circulating Heaters*

refrigeration field, where he has a wide background of experience in export, sales and engineering activities. He has been with Norge continuously since joining the commercial sales department of that company, in charge of export commercial sales, in 1937. He was appointed export manager in June, 1940.

* * *

Frederick G. Russell, traffic manager of Landers, Frary & Clark, was retired recently after completing seventy years of continuous service with the company, and with his retirement the traffic world lost one of its outstanding characters as he was generally considered the dean of New England traffic executives.

September 15th, the day upon which he was retired was the anniversary date of his entering the employ of Landers, Frary & Clark in the year 1871, when he started at the age of 10. Landers, Frary & Clark at that time manufactured hardware, and cutlery. Mr. Russell literally grew up with the company, working with every president that Landers, Frary & Clark has had in its nearly one hundred years of existence.

F. G. Russell

During his seventy years of service, Mr. Russell watched Landers, Frary & Clark grow from one small factory to a large, well-equipped plant with nearly two million square feet of floor space, manufacturing a variety of products and employing about 3,000 people. From the cutlery and small hardware lines manufactured in 1871 he has witnessed the expansion of Landers, Frary & Clark into many fields which include today the manufacturing of electrical table appliances, ranges, home laundry equipment and vacuum cleaners as well as the hardware, vacuum bottle and cutlery lines established earlier . . . and during the seventy year period he has seen the Universal name become a nationally known trade symbol.

Despite his eighty years, Mr. Russell worked actively every day up to the date of his retirement and among his associates is known for his progressive, young outlook on life.

* * *

E. W. Simons, president, Pittsburgh Reflector Company, recently announced appointment of **Charles H. Goddard,** general sales manager for the past year, as vice-president and director of sales. Mr. Goddard has moved his headquarters from New York City to the general office at Pittsburgh. Much of his time will be spent in the various sales territories throughout the United States.

Mr. Goddard has been identified with the lighting industry for many years. He joined Pittsburgh Reflector Company in 1931 as illuminating engineer and one year later was made New York branch manager. He served in this capacity until 1940 when he was appointed general sales manager.

* * *

Ernest Macaulay, a member of the G-E appliance and merchandise department since 1929, and most recently advertising supervisor for electric clocks at Bridgeport, has been appointed manager of advertising and sales promotion for the air conditioning and commercial refrigeration department, Bloomfield, by **J. P. Rainbault,** manager of the department. Mr. Macaulay has at various times been a field sales specialist on sunlamps and in charge of advertising and promotional activities on fans.

Statement of Ownership

Statement of ownership, management, circulation, etc., required by the Act of Congress of Aug. 24, 1912, and March 3, 1933, of Electrical South, published monthly at Marietta, for October 1, 1941.

State of Georgia, County of Fulton.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared J. C. Martin, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electrical South, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication, for the date shown in the above caption required by the Act of August 24, 1912, as amended by Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor and business manager, are:
Publisher, W. R. C. Smith Publishing Co., Atlanta, Ga.
Editor, Carl W. Evans, Atlanta, Ga.
Business Manager, J. C. Martin, Atlanta, Ga.

2. That the owners are:
W. R. C. Smith Publishing Co., Atlanta, Ga.; Estate of W. R. C. Smith, Atlanta, Ga.; J. C. Martin, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; E. W. O'Brien, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.; R. P. Smith, Atlanta, Ga.; and E. L. Philpot, Atlanta, Ga.

3. That the known bondholders, mortgagees and other security holders, owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities, are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security company but also in cases where the stockholders or security holders appear upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company, as trustee hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than so stated by him.

J. C. MARTIN,
Business Manager.

Sworn to and subscribed before me this 10th day of October, 1941.

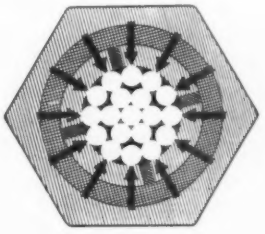
E. L. PHILPOT,
Notary Public at Large.

My commission expires Feb. 7, 1943.

You can't make a good water connection by pressing at two points.

But give it a good "Gorilla Grip" all around and you will have a tight positive connection.

The same applies to mechanical electrical connectors.



Cross Section of "Gorilla Grip" Connector

National Electric "Gorilla Grips" have 100% all around contact - not just two spots.

Pressure is uniformly distributed over full contact area of the Conductor and there is a "Gorilla Grip" for every Conductor, no matter where it terminates. "Gorilla Grips" can be used over and over again Emergency stock sets available or assembled to meet your needs with required fittings.

Write for descriptive booklet

National Electric
PRODUCTS CORPORATION
300 FULTON BUILDING, PITTSBURGH, PA.

Glenn Gundell, who has directed the advertising and sales promotion activities of the General Electric air conditioning and commercial refrigeration department, at Bloomfield, N. J., for the past five years, has relinquished those duties to become associated with the advertising division of the G-E appliance and merchandise department, at Bridgeport, Conn., it has been announced by **Boyd W. Bullock,** appliance advertising manager. Henceforth, Mr. Gundell will assist in the administration of the advertising division, which is responsible for advertising, sales promotion, and related activities for G-E refrigerators, ranges, water heaters, electric kitchen equipment, home laundry equipment, heating devices, fans, clocks, cleaners, construction materials, plastics, radio, air conditioning, and commercial refrigeration. Prior to his connection with G-E, Mr. Gundell was engaged in agency work in New York and with the Wichita, Kan., Beacon and the Denver Post.

What the Customer Should Know About Our Business

(Continued from page 33)

industry to establish and promote its value from that point on. The Code has and is doing a good job and I would be the last person who would encourage its abandonment or a disregard for its principles or expect it to carry a load we should be shouldering ourselves.

To accomplish this, we must feature specific values in understandable terms for the customer. The values of sufficiency and serviceability along with safety must be intelligently tabulated as definite and with exact purchase value. This sets up the question as to whether this method can be established. Can the workings of this unseen and very little element be set down in physical facts and values? We in Chicago have faith in such a process and we have done considerably with results.

We have spent in the neighborhood of $10,000 for what we termed at the outset as determining "Going Costs." Our Mr. Pierce originally sponsored the idea and laid it in my lap for development with the assistance of a very capable estimating engineer, Mr. Ray Ashley.

What a job it has turned out to be! We started with such data as could be located on costs. We reviewed several systems and found no great discrepancies between them. Our greatest trouble was to find contractors who would believe costs were not selling prices, or who had faith enough in any one of the systems to properly price their jobs. This led us to a decision that "Going Costs" were totally independent of "Going Contractors." I mean, of course, contractors going in the right direction.

To get a line on what a "going contractor" should be, we decided that there was very little to work on as long as most of our plans and specifications were stereotyped and antiquated; the Code established minimum standards; labor conditions were uniform in several localities and Central Station requirements were constant. Such standardization produced a system that was generating and multiplying price competition and retarding development in the industry.

We found that a fellow who can really do a job is harassed by the fellow who would like to try his hand at it, and he, in turn, is pestered by the fellow who is continually "shooting in the dark" and hoping for long shots.

The customer knows this condition prevails and is making good use of it. At least he thinks so and he will continue with this opinion until he has time to check up the operation of the installation. Of course, then it is too late for correction and his "penny wise and pound foolish" method of doing business becomes very costly and disturbing.

The contractor can't be blamed entirely because the usual process encourages whittling the job because the spotlight is always on the low figure. He also knows that if he attempts to add anything of value to the job, he cancels his competitive opportunity. So the old standard prevails and price is king.

To really establish "Going Costs" we must have "Going Contractors" also "Going Jobs."

"Going Jobs" must be off the beaten path and each one must have an individual analysis and a separate identity. There is no place for stereotyped specifications in any job. We will never get away from this process unless we take the values and necessities beyond the Code which should be included in an electrical installation and set them down as true values in words and music that the customer can understand and appreciate. No one contractor can bring this about, and no one would attempt such a process by himself as he would wind up in the poorhouse.

It will only be done by generally

THE GOVERNMENT COMES FIRST

Ward Leonard is under National Defense production. The goods we make are not used by themselves but become component parts of other equipment that may not be finished for many months. It is vital, therefore, that we give the government earliest possible deliveries.

There is room in our shop from time to time, however, for non-conflicting requirements which we wish to make available to our old friends. Yes, we want your inquiries . . . we will give them our best attention possible.

WARD LEONARD ELECTRIC COMPANY
37 South Street, Mount Vernon, N. Y.

WARD LEONARD

relays . . rheostats . . resistors

ELECTRIC CONTROL DEVICES SINCE 1892

accepted standards of values supported by faithful and definite performance. We believe such a process would reduce competition to fair proportions and promise additional uses of electricity because it establishes true values by being sufficient, serviceable and safe.

Better Management for Business Security

(Continued from page 20)

roll but limiting 6 per cent on investment may compel a drastic reduction in profit or eliminate profit entirely.

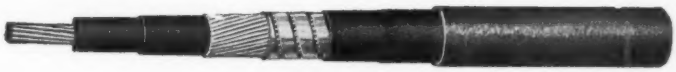
Already the small business man is feeling the pinch because of governmental rulings on priorities. Steps are being taken to relieve the situation. Outside assistance given the small business man is welcome, of course, but his difficulties can be circumvented to a great extent by the intelligent internal direction that is begotten of studious application to the fundamentals of good business management. So, "Know thy business" so that you may combat influences from within and without.

Inventory is a moot subject today and one that is too expansive to detail here. Suffice it to say that if ever an adequate stock control system is needed, now is that time. We know of few stock control systems that could be called adquate—only 5 per cent of the contractors and dealers contacted on our field studies of this problem utilize adequate stock control records. Most contractors appear satisfied if their stock bins carry inscriptions identifying contents but this is only part of the job.

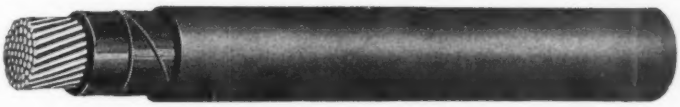
A study of reserves at the time you analyze your balance sheet should tell you whether your depreciation schedules are ample. We find that only 40 per cent consider depreciation when estimating so naturally this is a hidden loss on each contract handled by the remaining 60 per cent. Working capital isn't the sum total of your banked funds as many imagine. This important phase of management deserves consideration, the same as profit on sales, but seldom get it from contractors or dealers. Only 2 out of 100 interviewed know how to figure working capital.

The budget, profit and loss statement analysis, balance sheet analysis, and allocation of costs

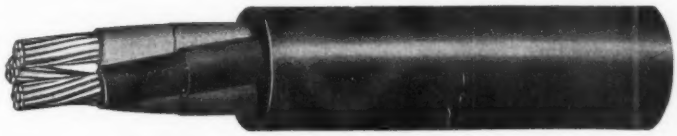
RUBBER COVERED POWER CABLES • BUILDING WIRE
CRESCENT
—*A Name That Stands For*
HIGHEST QUALITY
in every type of
Electrical Wires and Cables



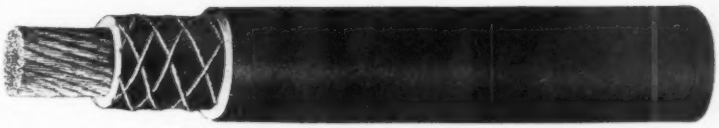
SERVICE ENTRANCE CABLE



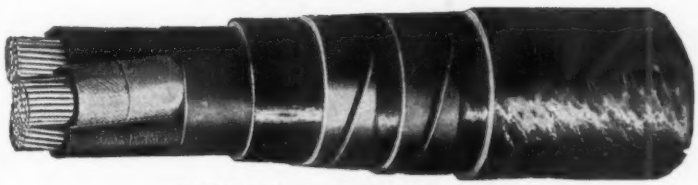
LEAD ENCASED POWER CABLE



IMPERIAL PORTABLE CORDS & CABLE



IMPERIAL WELDING CABLE



PARKWAY AND TRENCH CABLE

CRESCENT INSULATED WIRE & CABLE CO.
Ask Your Wholesaler For

CRESCENT
WIRE and CABLE
Factory: TRENTON, N. J.—*Stocks in Principal Cities*

SOUTHERN REPRESENTATIVES

ATLANTA, GA. — Edgar E. Dawes, A-4 Rhodes Bldg. Annex
NEW ORLEANS, LA. — Paul Hogan, Jr., 823 Perdido St.
DALLAS, TEXAS — Huie-Simmer Co., 103 Thomas Bldg.

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE
ARMORED CABLE • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • VARNISHED CAMBRIC
CRESCENT ENDURITE SUPER-AGING INSULATION

NEW GREENLEE CATALOG

TOOLS TO MAKE THE ELECTRICIANS' JOB EASIER

- HYDRAULIC CONDUIT BENDERS
- TUBE BENDERS
- KNOCKOUT TOOLS
- CABLE PULLERS
- PUSH DRILLS
- BORING TOOLS
- SPIRAL SCREW DRIVERS
- HYDRAULIC PIPE PUSHERS

Here's the new Greenlee Tool Catalog 33-E that every user of tools in construction and maintenance work should have. This handy buying guide has been compiled to make it easy to select the right tools for the job . . . tools designed to make it easier and faster for the man on the job. Write today for your free copy of this valuable reference of Greenlee Hand Tools for the electrical worker. You'll learn how these tools can help make your job easier.

Write Today for Your Copy

GREENLEE TOOL CO.

1707 Columbia Avenue • Rockford, Illinois

and overhead are the Four Horsemen of better business management because they touch every essential phase of business operation from turnover to pricing. Shall they stop short with the emergency or go cantering along after the duration? The post-war problems will be as acute, if not more so, than the present enigma. That makes it all the more reason why you should prepare now and carry on in years AD—after defense. To make a profit after the war you must be better equipped managerially than you were before the war. For example, the contractor who has never kept experience figures to fall back on when making current estimates may have gotten by in days gone by but he'll stand little chance in days to come. Profit can't be earned with mid-Victorian business methods in these airplane days any more than you can do a dependable job in the shortest time with cheap tools.

Charts Simplify Management

One excuse often given for the scarcity of analytical study is, "I hate to mull over figures." Mechanical-minded contractors are more likely to mouth this lament than dealers. For such, there is a way out, in fact, "chartography" is coming into increasing use in all fields. Once it was utilized only by big industrialists, but now contractors and dealers are finding it effective in presenting a graphic picture of each operation, from a comparison of estimated with budgeted figures to a study of experience costs by means of graphs in order to appraise the figures on current estimates. As with the budget, chartography is simple in fundamentals. Every contractor or dealer can make effective use of graphs to stop weaknesses.

The bookkeeping systems in half the establishments reviewed were defective in one way or another. Obviously, unless the bookkeeping system is of top quality, there is no chance of doing an effective managerial job because the figures may tell tall stories that throws reckoning askew. Contractors and dealers must improve their bookkeeping technique so that they can figure job costs accurately and compute the margin on sales with assurance that there will be a profit after the over-all costs have been deducted. If these computations are based on inadequate records, your best managerial efforts will go to naught.

Appliance Service Work May Be the Answer

(*Continued from page* 15)

panel designed to fit the needs of such a department.

Test Meters. No shop can hope to do satisfactory appliance testing and repairing without proper meters. Such meters should have reasonable accuracy and be rugged enough to stand hard usage. Three meters are suggested for a start: an 0 to 250 a-c voltmeter for checking line voltages and ground leakage on 110 and 220 volt motors; an 0 to 25 ammeter for checking current draw of motors, condensers and appliances, and a direct reading watt-meter. Later, it may be avisable to add an 0 to 5 ammeter for testing small appliances where the current consumption is very low and hard to read accurately on a meter of greater capacity. If many direct current motors are to be repaired, some additional direct current meters are desirable. Satisfactory meters for ordinary shop use can be purchased for $5 to $15 each.

Drill Press. A light bench or floor type drill press with a capacity of ½" is satisfactory for most electrical work, such as drilling out rivets, boring holes for machine screw threads, and ordinary shop work. A set of drills in a stand, up to ½" by 64ths, and a complete set of wire gauge drills should be provided. Tool steel twist drills cost more but last much longer than the carbon steel kind. A drill press will cost from $25 up.

Lathe. There is no tool that will do more useful work around a shop than a small lathe. A bench type with a bed about 4 feet long and a nine or eleven inch swing will handle about 98 per cent of the work that the ordinary appliance shop is ever called upon to handle. Besides truing up commuators, making bearings and bushings, a shop lathe will aid in making hundreds of special nuts, screws, studs, washers, insulators and the like. To be practical the lathe should be of a good make and be supplied with such attachments as a three jaw universal chuck, a four jaw independent chuck, a tail stock drill chuck, a self centering chuck for centerless shafts, tool holders, knurler, cutoff tool, boring bars, etc. A new lathe of good make with all essential attachments will cost from $300 up in the screw cutting models.

Reamers. A set of expansion

reamers are a necessity in fitting motor bearings on fractional horsepower motors. At the start a set starting a little below ½" and going up to about 1-3/16" will do. Others can be added from time to time.

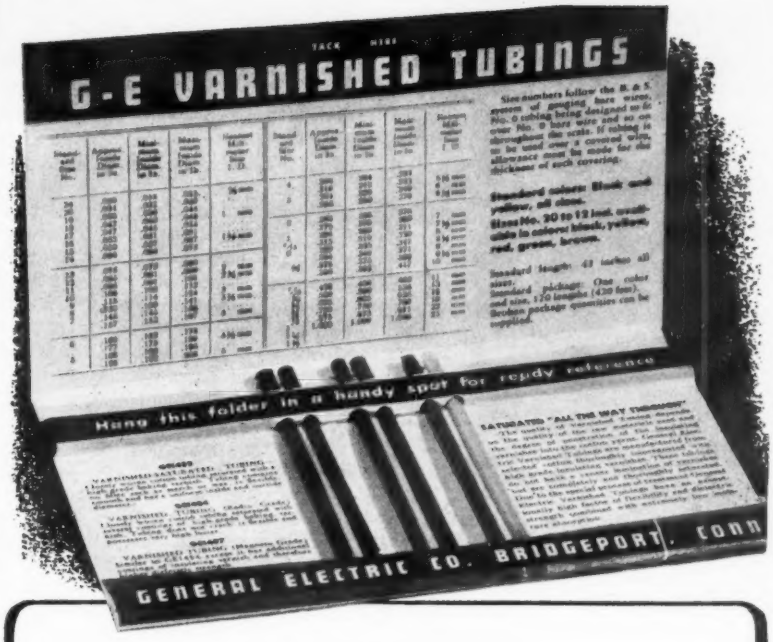
Arbor Press. A medium sized arbor or screw press is handy for pressing bearings in and out of housings, removing gears and pulleys, straightening bent shafts and other work. A small or medium sized press is best for small work and such big work as comes along can usually be taken to an automobile or machine shop where large presses are to be found. A good screw or arbor press should cost about $20 to $30.

Electric Drill. For the appliance shop a light ¼" electric drill is most handy for drilling in those hard to get at places, and for service work away from the shop. A light duty drill will cost about $15 to $25.

Tap and Die Sets. It is next to impossible to accomplish much around the shop without threading equipment. Three sets of taps and dies are needed to do general all around work. Two sets of taps and dies, ¼, 5/16, ⅜, 7/16 and ½ inch, are needed for the U.S.S. and the S.A.E. threads. Just as useful is a set of machine screw taps and dies. These should cover the following threads at least; 4-40, 6-32, 8-32, 10-32, 10-24, 12-24. In addition, it is well to provide a small stock of machine screws and nuts in these threads. Round head brass screws are best for most electrical purposes and the screw lengths needed run from ¼", ½", ¾" 1" and 2".

Small Equipment. There is hardly any limit to the small tools needed by a busy appliance shop, but for a starter the bench should be provided with two or three vises, one minature size for fine work, one medium and one large vise. A vise with a jaw spread of 8" or better is a handy way of holding motor frames while assembling or testing. A fairly complete set of hand tools, usually provided by the service man, go to round out the setup for the small shop. Fair work can be turned out by a skilled man with only a few tools; mediocre work can be done by a poor mechanic with an ample asortment of good tools; but first class work can be done only by a first class man with first class tools. There is no substitute for good tools.

How much can a typical appli-



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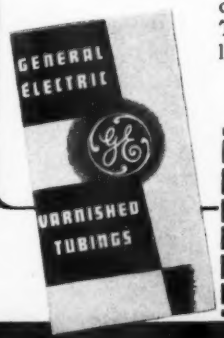
The new sample packet illustrated above contains six colored samples of G-E Varnished Tubings with descriptions and a complete listing of available sizes.



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Black Combination with Starter Socket Cat. 353

White — Cat. 351-W
White Combination with Starter Socket Cat. 353-W

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ance business afford to spend on starting a service shop? Well, there is no hard and fast rule to go by. Conditions are likely to differ in each case, but it is probably safe to say that about 10% of last years gross would be a fair price to pay for fitting out the shop during one year, you'll have the equipment to use for many years to come. A shop can be equipped all at once or the tools can be bought one at a time as the business warrants. There's advantages and disadvantages to both methods, and the one you choose is up to you.

After all is said and done, it remains a fact that selling booms and good times may come and go, but repair work goes on forever. Wear begins the first time the switch is turned on, and it is only a question of time before an appliance must come to the shop for cleaning, repairs, or a complete overhaul. A service shop in connection with your appliance business will not only bring in some dollars, but it will "keep them coming" to your store so that you have the chance to make additional sales. If you want to level out your business income, make more contacts, and keep your customers well satisfied, then you'd better think twice and look into the matter of establishing a department for the servicing of the appliances you sell. It can be made to pay good dividends.

Electrical Industry Affected by Priorities

(Continued from page 13)

It was also suggested in connection with the order that building codes in many cities require the use of excessive amounts of critical materials, and urged that such codes be suspended during the emergency.

General Repair Order

In preparation by the Priorities Division is an order which will assign a preference rating, probably of A-10, to repair parts for all purposes.

In the repair order of September 9 which listed food processing and storing as one of the essential industries there was some misunderstanding as to the coverage under "refrigeration." Retailers inquired of OPM if this extended to refrigerating equipment in commercial establishments such as restaurants and stores, and to household refrigeration. They were told that it covered food storing plants of processors and wholesalers but went no further. At the same time, they were told of the forthcoming order which would apply to commercial and household refrigeration.

Priorities experts are also working on a plan to aid procurement of tools and shop equipment for service establishments which will install repair parts.

Allocation Plan Significant

Perhaps of greatest significance is the allocations program which will assure each industry of a definite amount of materials for defense and non-defense production. A specified tonnage of each critical material would be assigned to each industry, according to the essential rating of the industry. A part of this tonnage would be assigned for non-defense production. Advantage over the present plan of "catch-as-catch-can" procurement — would be that the competition of the individual firm for material would be narrowed to one industry.

Some hint of greater aid to pri-

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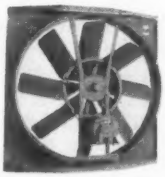

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vate industry was given at the time the repair order for the essential industries was issued when it was stated that "the entire inventory problem is to be studied with a view to providing broader priority assistance."

Future for Contractor

The probable impact of priorities upon the normal operations of the electrical contractor is such, say priorities experts in Washington, that no time should be lost in planning a program to meet the new conditions. The little contractor, say officials, is probably better off than the big fellow, for the latter, entirely occupied with defense contracts now may not have any a year from now. The small contracting firm has an excellent chance of survival, it is pointed out, if it goes out and builds up a repair business. Repair parts are provided by a preference rating, new construction is suspended. "Unless the contractor can go out and get repair business," said one official recently, "he had better pick up his tools and go work for somebody else."

The wholesaler of electrical supplies is doing an excellent job at present in aiding in the procurement of material for contractors. "Many wholesalers," says one prominent defense contractor in Washington, "will have learned to stock a complete inventory when this is over. They used to close out entirely lines for which they had little call. Now we are ordering those lines from wholesalers in other cities because we have to have them now, and the local firms are losing business."

Deliveries on materials for defense projects are moving slowly because of priority tieups. Contractors with private industrial construction already started report paying premium prices for scarce materials.

Future for Dealer

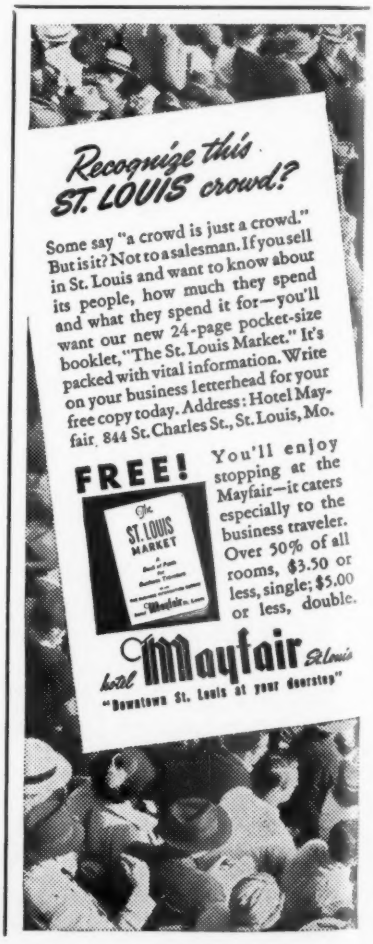
Recent certification of the household washer and ironer industry to the War Department for special treatment was undertaken by OPM as a result of the impending curtailment of non-defense production. The industry will receive preferred treatment in getting defense orders in order to alleviate unemployment that will result from curtailment. The certification stated that the industry is capable of producing 17 different defense items. With further curtailment of appliance production always threatening, the appliance dealer, too, is urged by defense officials to give more attention to repair service. Stacy May, director of the Bureau of Research and Statistics of OPM, recently declared in a New York speech that the production of electric appliances would have to be curtailed many times in order to put our war effort on a level with that of Great Britain and Canada. This statement was regarded as highly significant and the keynote of a renewed all-out effort which will double present defense production in 1942.

Simplification of Wire Sizes Proposed

(*Continued from page* 12)

sizes and types. (See Table I.)

I would use Type R wire from No. 14 to No. 1, and Type RH from 1/0 to 500,000 cir mils. In addition to No. 5 and No. 3 dropped out at the simplified practice meeting at the Bureau of Standards, I suggest omitting No. 10 and No. 6. (Type R No. 4 is rated at 60 amperes.) And in the larger sizes, I suggest drop-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ping 2/0 and 4/0, as well as 250,000, 300,000 and 400,000 cir mils cable. This means that in addition to No. 14 and No. 12 wire for branch circuits and small motors, we would have four other sizes, No. 8, No. 4, No. 2 and No. 1 for the 30, 60 and 100 ampere switches. Similarly, we would retain 1/0 at 150 amperes, 3/0 at 200 amperes, 350,000 cir mils at 300 amperes and 500,000 cir mils at 400 amperes.

I think it should be our aim to select wire sizes that correspond to the ratings of standard switches such as 30, 60, 100, 200, 400, and 600 amperes. This has been done in the proposed table, and in addition, wire sizes have been selected and rated so that they have a definite practical value when used in multiple for the higher amperages.

It is interesting to note that with only seven conduit sizes and ten wire sizes we can take care of branch circuit wiring and anything from a 30 to a 400 ampere switch; or, forgetting about branch circuits and small motors, we can take care of feeders or services from 30 amperes up to 400 amperes with only 7 wire sizes and 5 conduit sizes; or with Type RH cables in multiple for switches from 200 amperes up to 1200 amperes, only 3 cable sizes are needed, namely, 3/0, 350,000 cir mils, and 500,000 cir mils. This means that the manufacturer would have to make only six sizes of Type R wire from No. 14 to No. 1 inclusive, and only four sizes of Type RH from 1/0 to 500,000 cir mils inclusive.

In some sections of the country and from certain groups, this proposal has received a warm reception; from certain other groups and individuals a cool and disinterested response has been noted because it was felt the matter should be dealt with through regular code channels and not rushed through. This response suggests that probably the proposed simplification should not, for the present, be handled as a code matter at all. It is known to some of us that not so long ago certain officials in Washington inquired into the matter of saving rubber on rubber covered wires, not only to the extent of deceasing the insulation thickness, but also by removing the insulation entirely on one conductor and going to a bare neutral system.

For the sake of maintaining our procedure in making code standards, we cannot sit by for two more years and jeopardize the standards themselves! Therefore it appears to me that because of the present situation on materials such as rubber, copper, and steel, ways and means must be found and steps taken *now* to relieve the material shortage and at the same time clarify the wire and cable muddle. If the cable manufacturers develop, and if the Laboratories approve, a new all-purpose type of building wire, with proper rules and tables for the 1943 Code, there should be no difficulty in adopting the new product and the new rules and discarding those temporarily adopted as a defense program compliance measure. (There may in the meantime be a lot of other rules, restrictions, or changes affecting our daily life, much less desirable and entirely beyond our control, which we will have to accept.)

Well, what's the answer? It seems to me that two possible ways out present themselves, both aside from the Code itself. As mentioned earlier in this paper, the Simplified Practice Division of the Bureau of Standards has appointed a standing committee of three to keep the program in line with changes in the industry. That committee could propose a simplification of wire sizes and types as suggested in Table I.

However, I doubt personally if that would be as effective and as speedy as enlisting the aid of the OPM officials in Washington, and getting orders issued by them on the basis of conservation and allocation or rationing of essential materials. I believe that contacts and discussions of a preliminary nature have already been made, and that if the proposal has any merit at all, then full speed forward should be ordered. I believe the officers and directors of this Association, if it is the consensus of opinion of the membership, should take steps at once to ascertain the proper and most expedient approach to this problem of wire and cable simplification, and having found the avenue, to march forward to a speedy solution.

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104. SHOP EQUIPMENT—Shop Boxes, Stacking Boxes, and Taper Pans for handling and storing small parts. Tool Boxes, Tool Cabinets, and Bench Drawers. Illustrated catalog shows many uses. All-Steel-Equip Co., Aurora, Ill.

105. COOLAIR HOME-COOLING FANS—FORM 141—Complete descriptions of 1941 Coolair single and twin attic fans, window fan and new automatic ceiling shutter. Also contains valuable installation suggestions. Designated as Form 141. American Coolair Corp., Jacksonville, Fla.

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112. TELEPHONE & CODE CALL EQUIPMENT—A new Bulletin No. 108 is available describing the new Couch "Autophone" System of automatic telephones which incorporates valuable features among which is a Code Call circuit which may be used in conjunction with the telephone system. This system is designed for industrial, commercial and institutional buildings. S. H. Couch Company, Inc., North Quincy, Mass.

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114. IDEAL PRODUCTS CATALOG — A special 25th anniversary catalog has just been issued describing the complete line of Ideal Products. Electrical Contractors, Motor Rewinders, and Industrial Maintenance Electricians will be particularly interested in this comprehensive publication. Ideal Commutator Dresser Co., 1270 Park Avenue, Sycamore, Ill.

115. FLUORESCENT LIGHTING ACCESSORIES—Spring Bulletin No. 2, describing and illustrating complete Lloyd line of Fluorescent Lamp Holders, Starters, Starter Sockets and Holder and Socket combinations. Lloyd Products Company, Providence, R. I.

117. MECHANICAL CONNECTORS—First Aid for electrical systems through the use of mechanical connectors is the subject of an interesting twenty-page booklet now available. In addition to specific construction and sales of the new "Gorilla Grip," this booklet describes a wide range of mechanical connectors for every size and purpose. National Electric Products Corp., Pittsburgh, Pa.

120. SQUARE D COMPANY announces the Spring issue of the Square D Digest, dated April, 1941. This condensed catalog contains listings and the latest prices of many Square D products, including Safety Switches, Service Equipment, Multi-breakers and other Circuit Breakers, Panelboards, Motor Control and Pressure Switches. Square D Co., Detroit, Michigan.

121. NEW WIRE CATALOG—A new catalog just issued by the United States Rubber Company contains complete specifications for every type of building wire and cable—single conductor and multiple conductor, rubber insulated and synthetic insulated, fibrous covered and lead covered. United States Rubber Co., Rockefeller Center, New York, N. Y.

125. Y. P. S. SINKS—Folder No. 1056 shows the complete line of eleven sinks now manufactured by this company. These eleven sinks vary in price from the lowest priced sink of standard specifications to the greatest dollar value in 66-inch double bowl sinks. Youngstown Pressed Steel Division of Mullins Manufacturing Corp., Warren, Ohio.

127. MOTOR CONTROL APPARATUS—"Arrow—H&H" catalog No. 8, 94 pages listing Magnetic and Manual Starters, Push Button Stations, Enclosed Switches, Relays, Service Equipment and Circuit Breakers. The Arrow-Hart & Hegeman Electric Company, Hartford, Conn.

129. BULLETIN 403 on BullDog enclosed bus bar system of electrical distribution for commercial and industrial use. Forty-four pages of construction details, applications, dimensional data and technical charts. BullDog Electric Products Co., 7610 Jos. Campau, Ave., Detroit, Mich.

140. WIRING MATERIALS: A series of folders on different G-E Wiring Materials are available, including: Pub. No. 54-4102-1 on wiring devices; Pub. No. 58-4106-1 on Type RW wire; Pub. No. 58-96 on rubber-insulated building wire; Pub. No. 58-4014F-1 on Flamenol Type SN wire; Pub. No. 54-814-1 on fuses; Pub. No. 53-408 on conduit boxes; Pub. No. 53-402 on conduit, BX, BraidX, etc.; Pub. No. 54-83 on mercury switches; Pub. No. 54-63-1 on branch-circuit circuit breakers; Pub. No. 51-4118 on G-E Home Wiring. General Electric Co., Appliance and Merchandise Dept., Bridgeport, Conn.

141. NEW FLUORESCENT BOOKLET — "How to Speed Sales with G. E. Fluorescent Lighting." This booklet reviews the progress of lighting since the year 1602 up to the present time and is completely illustrated with pictures, charts and recommendations for modern fluorescent illumination. Lamp Department, General Electric Company, Nela Park, Cleveland, Ohio.

143. CELL STRUCTURES AND DOORS: Technical Data Series 426 contains complete information on Trancell, lightweight, fireproof sheet material for housing electrical equipment. Various types of materials and typical constructions are included. Johns-Manville, 22 East 40th Street, New York, N. Y.

147. TIME SWITCHES: Bulletin on New 300 Series. The only Time Switch with just two gears in the open—all others operate in a sealed oil-filled chamber. Dust proof. Ideal for signs and general time switch applications. Paragon Electric Company, 409 South Dearborn Street, Chicago, Ill.

148. LITTLE GIANT RELAY—A new small Relay for use on A. C. or D. C. is described in a Ward Leonard Bulletin No. 105. The Relay is available in single pole, single or double throw contacts. On standard frequencies, coils can be obtained for 6 to 230 volts. Complete information on contact rating is given in the bulletin. Ward Leonard Electric Co., Mount Vernon, N. Y.

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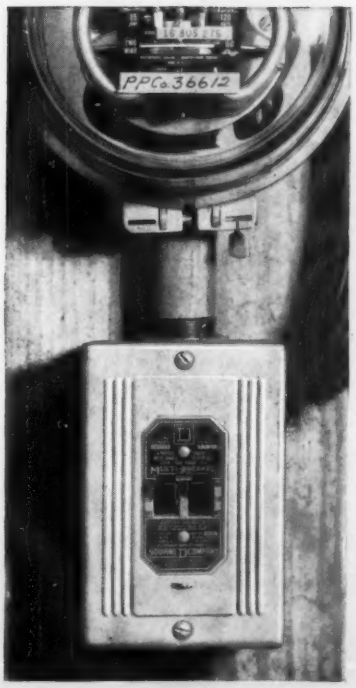

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